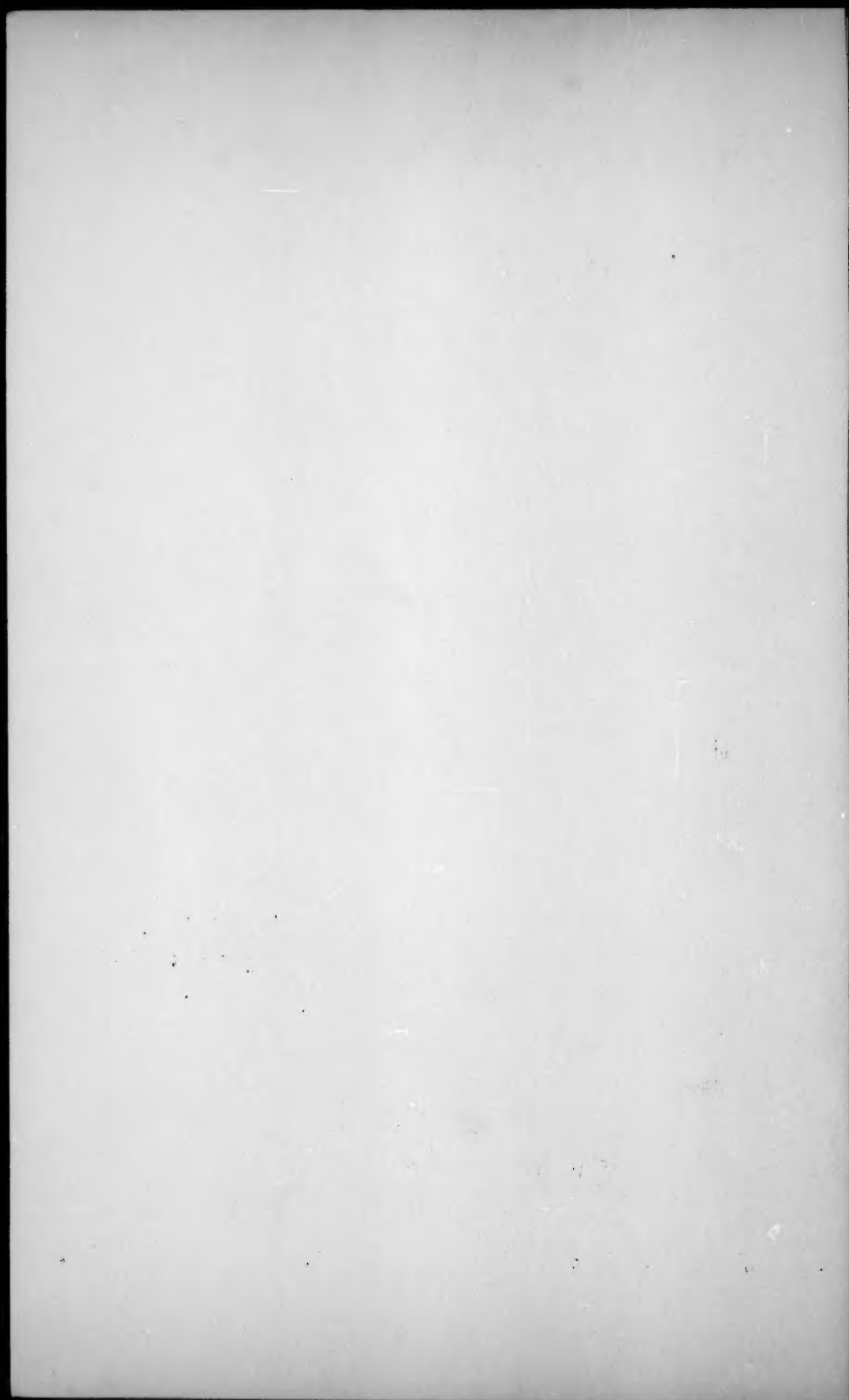


# CHILD DEVELOPMENT

Vol. 23  
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# CHILD DEVELOPMENT

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## IN MEMORIAM

Dr. Beth Lucy Wellman died March 22, 1952, at the age of 56 after 32 years of service to the Iowa Child Welfare Research Station. She joined the staff in 1920 as the secretary to the first Director, Dr. Bird T. Baldwin, and went ahead to complete her Ph.D. degree in the succeeding five years, during three of which she served as Research Assistant on the Station staff. She spent one year at Columbia as research associate in the Lincoln School in 1924 and 1925, then returned to Iowa as research assistant professor of child psychology. She became a full professor in 1937.

Her rich and constructive professional life is well known—her bibliography contains more than 70 articles in the field of child psychology and child development. The text *Child Psychology* published in 1934 was written with Dr. George D. Stoddard, and its accompanying manual, also written with him, was published in 1938. Her contributions to the literature on the development of intelligence, cultural and educational impacts upon intelligence, motor development, and the social psychology of childhood are known to all in psychology, have had profound impacts on practices in social work and education, as well as in psychology, and have stimulated much further research.

Dr. Wellman, during most of her time at the Station, supervised and allocated the work of the Research Assistants, and has always carried more than her full share of local university and national psychological and child development committee and planning work. It is typical of her that, although fatally ill and fully cognizant of her condition, she worked until the final working day before her admission to the hospital on Sunday, March 2, contributing incisively to research reportage at a seminar held that day.

After the death of the first Director, Dr. Baldwin, Dr. Wellman assumed the guardianship of his three young children, rearing them in her home as her own children.

There are no words to describe the constructive emotional and intellectual impact which Dr. Wellman has made upon the Station staff and upon all of her students, of whom the writer is one. We loved her deeply and respected her completely.

BOYD McCANDLESS

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## NOTICE

The editorial and business office of the Society for Research in Child Development, Inc., is being moved to New Orleans, La., and after October 1 all correspondence should be addressed to

Child Development Publications  
Department of Neuropsychiatry  
School of Medicine  
Louisiana State University  
New Orleans 12, Louisiana

There will be no change in personnel, but there must necessarily be some interruption of normal business operations during this move. We ask your patience while the new office is being set up and the rather extensive task of reorganization as an autonomous society is completed.

THE EDITORS

## A COMPARISON OF CERTAIN PERSONALITY TRAITS AS RATED IN THE SAME INDIVIDUALS IN CHILD- HOOD AND FIFTY YEARS LATER <sup>1</sup>

MADORAH E. SMITH

*University of Hawaii*<sup>2</sup>

The loan of a mother's journal provided the rare opportunity for studying the constancy of certain personality and other traits by comparing her children's relative standing on traits as rated from data in the record and as they are now rated, fifty years later. There were six children for whom similar records were kept separately. These records were in sufficient detail and included enough objective data to permit comparison of one child with another and to make it possible to rate the children on about 40 different traits. For the adult data, one of the subjects served as informant and three outside persons, who knew them all well, served as judges in the adult ratings.

The journal covered eight years in time with entries made on 211 different dates. Under 86 per cent of the dates, entries were made under each child's name. There were three children in the family at the time the journal was begun and six when it ended. There are also some additional notes giving certain data for the periods preceding and following the years covered by the diary. The children ranged in age from three years to over twelve at the time the journal closed, which was not at the same date for each child. In order that at least three children could be compared at each age level, no material was included in the statistical treatment which had been recorded after the child's eighth birthday, except in the rating of character traits. Only full years are used for each child, except Quarta. This exception was made because there were more references during the last seven months of her record than in a full year for each of the older children. This interval covers a period of furlough. During that year, the record appears to have been interrupted from time to time by travel.

At the time that the diaries were being recorded, the parents were missionaries in China. From the tone of the journal and from statements made by our informant, the writer of the records is pictured as an affectionate mother striving for impartiality and consistency in her dealings with the children. She was a devoutly religious and conscientious woman with a keen sense of responsibility in the raising of her children. For example, she writes, "One trembles at the responsibility of controlling his will."

<sup>1</sup> Certain changes in non-essential data have been made to avert embarrassment on the part of the subject.

<sup>2</sup> Emeritus.

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Apparently her first concern was the religious training of her children, after which followed, in order, their health, behavior, and character in general, intellectual development, and social contacts. This last was a difficult matter, since the foreign community where the family lived was very small.

TABLE I  
SUMMARY OF DATA CONTAINED IN MOTHER'S JOURNAL

Age (in years)	No. of Children	Total No. of Items	Per 1	Cent 2	of 3	Total 4	by Category 5	6
			Health	Learn- ing & Matur.	Behav. Train. & Int.	Quot. of Child.	Treats, Out., & Trips	Misc.
0 to 1	4	291	26	24	31	0	2	17
1 to 2	4	314	32	23	30	4	2	10
2 to 3	5	343	24	11	39	13	6	7
3 to 4	5	367	19	8	34	28	4	6
4 to 5	5	385	10	11	34	25	9	10
5 to 6	4	329	12	24	39	10	6	9
6 to 7	4	292	14	24	33	5	12	13
7 to 8	3	294	14	16	36	4	11	18
Total .....		2615						
Average Per Cent .....			19	17	35	12	6	11
				Number	of	Items	per	Child
3 to 8	Prima .....	300	14	18	32	16	9	11
2 to 8	Secunda ...	433	21	20	31	15	5	9
0 to 8	Tertius ....	542	16	19	36	9	8	13
0 to 6-6	Quarta ....	527	20	18	34	12	6	11
0 to 5	Quintus ...	508	17	13	37	17	6	10
0 to 3	Sextus ....	305	27	15	37	3	5	13
TOTAL NO. OF ITEMS ..		2615	490	447	923	316	162	277

As the children grew older, the opportunities for play with their age peers grew less since other parents sent their children away to school at an earlier age than any of our subjects.

The family was quite companionable; both parents played with and read to the children frequently. Save on her mission duties (which were not very numerous at that time), the mother rarely went anywhere without taking one or more of the children with her. The father also took them out often on treats, and, at the time the journal ended, he had begun to take with him one of the older children whenever he went on shorter business and itinerating trips. Discipline in the home was rather strict but not severe. The parents agreed in matters of discipline and the care of the chil-

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dren, but the mother was the more active in their control. Religious values may have been overstressed, but the children felt secure in their parents' affection. There were two close-knit pairs among them: Secunda and Tertius, and Quentin and Sextus.

TABLE 2

AVERAGE HEALTH SCORES IN POINTS BY AGE GROUPS AND FOR EACH CHILD DURING PERIOD COVERED BY JOURNAL

<i>Number of Children</i>	<i>Age in Years</i>	<i>Health Score</i>
4	0 to 1	-15.8
4	1 to 2	-15.2
5	2 to 3	-13.6
5	3 to 4	- 8.6
5	4 to 5	- 4.6
4	5 to 6	- 4.8
4	6 to 7	- 7.8
3	7 to 8	- 5.0
<i>Name of Child</i>		
Prima	3 to 8	- 7.0
Secunda	2 to 8	-11.2
Tertius	0 to 8	- 3.8
Quarta	0 to 6-6	- 8.0
Quentin	0 to 5	- 9.6
Sextus	0 to 3	-29.0

The material in the journal has been grouped into six categories:

1. Health
2. Learning and Maturation
3. Behavior, Training, and Interests
4. Quotations of the Child's Remarks
5. Treats, Outings, and Trips
6. Miscellaneous, including references to the weather and current events, routines such as daily schedules and feeding formulae, remarks as to the child's physical appearance, etc.

The data gathered from the diaries are summarized in Table 1.

## HEALTH

Of all references, 490 (19 per cent) were concerned with the health of a child. In order to compare their health status, a score was calculated for each child for each year of comparable data. This health score was deter-

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mined by subtracting three points for each occurrence of a more serious illness, e.g., influenza, malaria, glandular fever, scurvy, measles, and whooping cough; two points for each lesser ailment, e.g., colds and skin infections, and for the six accidents of such severity that the mother remarked, "We almost lost her"; one point for mention of failure to gain and of filling of teeth. A score of three points was added for all references to the child's good health such as, "Quarta has had the best health of all this year," or "Tertius is very well now." The averages of these scores, presented in Table 2, for the first three years of life are much lower than for the last five. Each baby apparently started gaining nicely and, with the exception of Tertius, who had measles at three months, kept well so long as he was breast fed. With weaning, trouble began. Yet the mother was subscribing to a mother's magazine and consulted a physician regularly. However, the climate was unhealthy and the city unsanitary. Between six and thirteen months, Tertius had whooping cough, Sextus nearly succumbed to malaria and scurvy, and each of the other children suffered from serious intestinal disorders. The three whose illnesses during this period were most prolonged were the last to walk alone—at 15 to 16½ months, although one of them, Tertius, had started to walk with support at 8½ months (earliest of all the children).

The averages of the health scores for each child individually are also shown in Table 2. Sextus has by far the lowest score. This is partly an artifact of his record, since it covers only the first three dangerous years. Prima's score, since it excludes the same years, is probably spuriously high.

An examination of the six-year-old weight and height records suggests that a different ranking would have been found at that age. (See Table 3.) At that time, Sextus, as well as Tertius, was only slightly underweight for height according to the Baldwin-Wood tables, but the other four were all from 8 to 10 per cent underweight. Shortly after he was six, Sextus suffered from a series of illnesses: typhoid, diphtheria, and measles.

TABLE 3  
SIX-YEAR-OLD HEIGHT-WEIGHT RECORDS FOR EACH CHILD\*

<i>Name</i>	<i>Height (Inches)</i>	<i>Weight (Pounds)</i>
Prima .....	42.125	35.0
Secunda .....	42.125	35.0
Tertius .....	45.0	44.875
Quarta .....	43.5	38.25
Quentin .....	42.25	36.0
Sextus .....	46.0	47.5

\* Prima was three months past her sixth birthday at the time of these measurements; the others within a few days of birthday.

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The ranks of health scores compared with present ranks as to health are similar as can be seen from the following tabulation:

	<i>Prima</i>	<i>Secunda</i>	<i>Tertius</i>	<i>Quarta</i>	<i>Quentin</i>	<i>Sextus</i>
Childhood rank .....	2	5	1	3	4	6
Adult rank .....	4	5	2	3	1	6

Sextus, who died when in his early thirties, ranks sixth both times. Secunda and Quarta also hold identical ranks. The greatest change is that Quentin has moved up three places in rank. He is now the youngest of the living members of the family, and was also the youngest to leave the unsanitary Chinese city (at age 8). In a note added some time after the original entry, the mother comments regarding Secunda, "She cut her teeth hard and slowly and had the worst [deciduous] set of all." Secunda is one of the two who now have artificial teeth.

Measurements of height and weight are recorded frequently, but after the first year not at corresponding ages. The adult rank in height as tabulated below is foreshadowed even at birth. If the sexes are considered separately,

	<i>Prima</i>	<i>Secunda</i>	<i>Tertius</i>	<i>Quarta</i>	<i>Quentin</i>	<i>Sextus</i>
Rank at Birth .....	6	4.5	2.5	2.5	4.5	1
Adult Rank .....	6	5	1	4	3	2

the three girls hold identical ranks at birth and at six years as they did at the time of Sextus' death. The three boys have the same ranks at birth and at six years, but by the time adult stature was reached, Tertius was taller than Sextus, whereas Sextus had been the taller before. Quentin has been the shortest ever since Sextus passed him when they were eight and six years old, respectively.

TABLE 4  
LANGUAGE DEVELOPMENT OF EACH CHILD

<i>Name</i>	<i>Used 4 Words</i>	<i>Talked Well</i>	<i>Rank</i>	
	(Age in Months)	(Age in Months)	3 1/2 years*	5 years†
<i>Prima</i> .....	...	..	.	3
<i>Secunda</i> .....	10	24	1	1
<i>Tertius</i> .....	12.5	25	3	2
<i>Quarta</i> .....	12.5	31	5	5
<i>Quentin</i> .....	11.0	31	4	4
<i>Sextus</i> .....	8.5	29	2	.

\* From data up to 3 1/2 years.

† From data from 3 1/2 to 5 years.

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### INTELLIGENCE AND LEARNING ABILITY

From the references placed in the second and fourth categories, the children's intelligence and learning ability were estimated. Data in the second category (Learning and Maturation) are of two kinds. Many notations in the early years concern developmental progress; those in the later years refer to the formal education of the children. The ranks of the children in learning to talk (Table 4) were determined by data from two age levels. The five younger children are ranked from data recorded before the age of three years, six months. Prima could not be included in this set of ranks since the only comment on her speech before that age is that she began to talk at eleven months, at which time she used two words. The last mention of the speech of Sextus is at three years, three months, so he could not be included in the second ranking. This latter set is based on references after the age of three years, six months, and extends to five years.

Ranks for the first level were obtained from the sums of ranks on seven factors. These are: using first word, using four words (Gesell's standard for one year), "uses sentences," "talks well in both languages" (or an equivalent phrase), "repeats from memory" (Bible verses, catechism answers, words of songs), and two other factors derived from a study of the direct quotations in Category 4 (Quotations of the Child's Remarks). These were the age of the first use of "I" and the average length of all sentences recorded as spoken by the child before the age of three-and-a-half. Secunda was late in using "I" and did not start to talk as early as Sextus. On all other factors she ranked first. Tertius, who was the only one not troubled with two languages, "used pronouns well" at two years of age (the family at that time was on furlough in the United States). This was at an earlier age than any of the other children. He was also ahead of Sextus in repeating from memory. Quentin tied with Secunda in the age of using the first word and used four words only a little later than she did. However, after his early start, he did not progress so rapidly as did Secunda and Tertius. Quarta ranked last in six of the seven factors.

The second set of ranks in language development is based on four factors, all derived from a study of the quotations. These are the age at which last quotation not using "I" correctly is recorded, average length of all sentences quoted during this period, the lowest number of errors per hundred words, and the highest number of inflected words per hundred. The ranks of the four children considered at both age levels are identical in the two sets, which suggests that the measures used have a certain degree of validity. However, the quotations were evidently selected and consequently the sentence length found higher than that which the children's unselected speech would have shown. In this Tertius was much closer to Secunda than at the first ranking, and Quarta to Quentin, while Prima was very little above him.



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Since none of the children was sent to boarding school until at least ten years of age, the mother, throughout the period studied, was the children's sole teacher. Aside from some religious and kindergarten lessons which were begun earlier, formal instruction was commenced some time in the fifth year in the case of each child. After that the only interruptions were due to illness or special holidays with a lighter schedule during summer vacations. There was one exception—Prima, whose lessons were begun at four years, eleven months of age, the latest of all, and whose first year of schooling was much interrupted by the travels of the family on furlough.

By their fifth birthdays, the mother wrote that *Secunda*, *Tertius*, and *Sextus* were all able to read "very well." The other three at that age knew only a few words and could not read "Quite well" until six years, four months in the case of *Quarta*, and until just six in the case of *Prima*. Since the mother mentioned each new book the child read, it was hoped that the age of starting the first reader might give a more objective measure. However, it did not prove so, since the amount previously read varied greatly. *Secunda*, when she began the first reader at just six, had already read and learned to spell all words in four primers, read three of the four Gospels, ten children's story books, and had begun a text in Geography. *Tertius* had read about two-thirds as much when he began the first reader at the same age, but he had done more in arithmetic and writing. Both children "carried nicely" in addition by that age. *Prima* had read only about half as much as her sister, and *Quarta* even less when they began the first reader at six years, five months, and six years, six months, respectively. It is from these data on progress in speech, learning to read, and the acquiring of arithmetical skills that the I.Q. levels are estimated.

Our informant tells us that despite the series of illnesses in his seventh year, *Sextus*, during the first years after the father's resignation and the family's move to America, accomplished four years' work in two and thus caught up to *Quentin* before he was nine. The following tabulation shows the estimated I.Q. level and the years of school completed for each child. As can be seen, the estimated childhood I.Q.'s of *Secunda*, *Tertius*, and *Sextus* are all above 120, throwing them into the very superior level; of *Prima*, 115, in the superior level; while *Quarta* and *Quentin* were average.

	<i>Prima</i>	<i>Secunda</i>	<i>Tertius</i>	<i>Quarta</i>	<i>Quentin</i>	<i>Sextus</i>
		Very Superior	Very Superior	Average	Average	Very Superior
Estimated Childhood I.Q. . .	Superior	Superior	Superior	Average	Average	Superior
Years of School Completed.	16	20	17	12	13	16

Their reported schoolwork in American schools and the extent of their education confirm the constancy of these I.Q.'s. *Secunda* graduated at the head of her class from college; *Tertius* and *Sextus* with "magna cum laude"; and *Prima*, a very conscientious student by that time did good average work

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at college. Quentin's grades were not outstanding and were near failure in the freshman year of college, although he would have been permitted to continue had he so desired. Quarta was a weak student and never quite finished high school, leaving to take a commercial course in which she again did not complete all subjects.

TABLE 5  
BEHAVIOR SCORES BY AGE GROUP AND FOR EACH CHILD

<i>Number of Children</i>	<i>Age in Years</i>	<i>Average Behavior Score</i>
4	0 to 1	2.2
4	1 to 2	0.2
5	2 to 3	3.0
5	3 to 4	6.0
5	4 to 5	1.0
4	5 to 6	3.5
4	6 to 7	5.5
3	7 to 8	7.0
<i>Name of Child</i>		
Prima	3 to 8	9.4
Secunda	2 to 8	8.7
Tertius	0 to 8	-0.2
Quarta	0 to 6-6	1.7
Quentin	0 to 5	0.8
Sextus	0 to 3	0.7

The highest occupational levels the children attained as adults are: college professor by Secunda, C.P.A. by Tertius, high school teacher by Sextus, grade school teacher by Prima, building contractor by Quentin, and clerical positions by Quarta. So far as occupation is an index of intelligence, their ranks would not differ much as adults from those in childhood.

### BEHAVIOR, TRAINING, AND INTERESTS

In items referring to the children's behavior, interests, likes, and dislikes, and their training, four scores were derived. The first of these, the behavior score, was calculated by counting all favorable mention of a child's behavior and crediting two points when it is unqualifiedly approved, one if it referred to improvement or was otherwise qualified, and subtracting one for each time his behavior was deplored, two when it was considered bad enough for punishment. Such scores were calculated for each year separately. The yearly scores were then averaged for the final scores (See Table 5). References to the child's actions that were neutral in tone did not affect the

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behavior score. These included mention of various activities at home, e.g., play and the earlier years of habit training.

The mother did not seem disturbed by the three finger-suckers—Tertius, Quarta, and Quentin—until after they were two years old, at which time she began to put bags on their hands at night. Even in the third year she

TABLE 6  
PUNISHMENT SCORES BY AGE GROUP AND FOR EACH CHILD

<i>Number of Children</i>	<i>Age in Years</i>	<i>Average Punishments</i>
4	0 to 1	0.8
4	1 to 2	1.0
5	2 to 3	3.0
5	3 to 4	1.2
5	4 to 5	2.0
4	5 to 6	1.8
4	6 to 7	1.1
3	7 to 8	3.3
<i>Name of Child</i>		
Prima	3 to 8	0.8
Secunda	2 to 8	0.8
Tertius	0 to 8	2.4
Quarta	0 to 6-6	2.3
Quentin	0 to 5	3.0
Sextus	0 to 3	3.0

comments on each of them using their fingers as comforts when in a strange place as at Sunday School. "He sucked his fingers, sat very still, and did not say a word."

Mention of beginning toilet training is very meager; Quarta's was begun at thirteen months. However, Quentin had learned by the time he was nine months to call for help even at night, and so became "the cleanest baby." The mother does not mention punishing any child for lapses in toilet training, except Tertius, whom she began to punish for his failures after he was four-and-a-half years old.

The punishment score (Table 6) is the average number of times a year that mention is made of a child's receiving punishment. According to both behavior and punishment scores the boys were naughtier than the girls, although Quarta was very little better than the boys. The average behavior score is lowest of all in the second and the fifth years, but punishments for the fifth year rank only third in frequency. They are most numerous in the third year and eighth. During the first year the most frequent favorable

TABLE 7—COMPARISON OF CHILDHOOD AND ADULT RATINGS ON VARIOUS PERSONALITY TRAITS

Name of Trait	Prima		Secunda		Tertius		Quarta		Quintin		Total Difference	Shifts of More than One Step	Average Scores of			
	Child	Adult	Child	Adult	Child	Adult	Child	Adult	Child	Adult			Older	Younger	Boys	Girls
Affectionate	1	1	3	2	4	4	1	1	4	3	2	0	2.7	2.5	4.0	1.7
Ambitious		3	2	4	1	3	0	0	0	2	9	4	1.0	0.0	0.5	0.7
Attractive		0	3	2	1	2	1	0	3	2	5	1	1.0	2.0	1.5	1.3
Brave, patient	1		4	3	0	3	0	0	1	1	5	1	1.7	0.5	0.5	1.7
Bright, learns quickly	0	1	4	4	3	4	0	0		1	3	0	2.3	0.0	1.5	1.3
Conscientious	1	1	4	4	4	4		0		2	6	2	1.7	0.0	0.0	1.7
Exact	1	1	1	2	2	2			1	1	2	0	1.3	0.5	1.5	0.7
Generous	3	1	1	3	2	1		0	1	2	6	2	2.0	0.5	1.5	1.3
Happy, contented	1	0	4	2	1	3	1	0	2	2	6	2	2.0	1.5	1.5	2.0
Helpful	4	3	3	3	2	4	4	1	1	3	8	3	3.0	2.5	1.5	3.7
Interesting, entertaining		0	2	2	2	2	2	2	0	3	4	2	1.3	2.5	2.5	1.3
Makes friends		1	3	2		1		0	1	2	4	0	1.0	0.5	0.5	1.0
Neat, clean		2	1	1		2		0	3	1	6	3	0.3	1.5	1.5	0.3
Persevering	0		1	4	1	4		0	1	2	7	2	0.7	0.5	1.0	0.3
Religious	3	3	4	2	2	2		1	2	3	6	2	2.3	1.0	1.0	2.3
Sympathetic		1	1	3	1	4		0		3	9	3	0.7	0.0	0.5	0.3
Active	3	3	3	3	1	4		0	3	3	6	2	1.3	1.5	2.0	1.0
Chatterbox	1	4	4	3		3		0	3	3	7	2	1.7	1.5	1.5	1.7
Fond of dress		1	0	0		0	4	1	2	0	6	2	0.0	3.0	1.0	1.3
Imaginative	1	3	2	1	3	1	1	1	2	1	7	2	2.0	1.5	2.5	1.3
Bossy, interfering	2	3	1	1		0			1	1	1	0	1.0	0.5	0.5	1.0
Careless	0		3	1	1	1			1	1	4	1	1.3	0.5	1.0	1.0
Contrary		0		0		0	4	3	1	0	2	0	0.0	2.5	0.5	1.3
Fretful, irritable	4	3	1		2		4		2		10	3	2.3	3.0	2.0	3.0
Jealous	2	2					1	1	1	0	1	0	0.7	1.0	0.5	1.0
Nervous	2	3	1	2		0	1	1	1	1	3	0	1.0	0.5	0.0	1.3
Quick-tempered			1	2	1	1	1	1	1	1	1	0	0.7	1.0	1.0	0.7
Quarrelsome			2		1		2	3	1		6	1	1.3	1.5	1.0	1.7
Selfish	0	1	3	0	0	0	4	2	1	0	7	2	1.0	2.5	0.5	2.3
Sensitive	2	1	0	0	3	0		3		0	7	3	1.7	0.0	1.5	0.7
Shy			1	2	1	2	0	0	2	1	3	0	0.7	1.0	1.5	0.3
Slow, dilly-dallies	1	0		0	2	0		1		0	4	1	1.0	0.0	0.7	0.3
Spunky, tantrums		0		1	2	1	3	1	2		7	3	1.0	2.5	2.0	1.3
Strong-willed [subborn]		1	1	1	2	1	2				5	1	0.7	1.0	1.0	0.7
Teases	2		2		1		4		1		10	3	1.7	2.5	1.0	2.3
DESIRABLE																
NEUTRAL																
UNDESIRABLE																

DESIRABLE

NEUTRAL

UNDESIRABLE

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comments were that the baby was "good" or "happy." The most frequent unfavorable ones were that the baby was "cross" or "fretful," which was usually when he was sick. The three punishments recorded for the first year were *slapping of the small hands to teach them not to touch and the meaning of "No."*

*There were 78 punishments inflicted during the eight years of the diaries, all but two of them by the mother. Fifty-five per cent of them were by whipping, spanking, or slapping. Probably corporal punishment did not actually bear so high a proportion of punishment, as there are suggestions that it was used as a last resort. Deprivation of some treat or of the disputed article occurred in 15 per cent of the cases and being sent earlier to bed 13 per cent. Tying the meddlesome hands or runaway feet together was used in 7 per cent of the instances, threats or scolding and shaming 4 per cent each, and in the remaining instances, the method used was not stated. The offense most frequently punished was disobedience. If impudence and misbehavior at church or school are included under that head, 70 per cent of all punishments can be subsumed here. Quarreling comprised 12 and tantrums 10 per cent of the faults punished. Wetting, dilly-dallying and using a "dirty word" were the only other offenses for which punishment was inflicted. The mother, however, mentions 16 times talking with the child about his faults or undesirable habits, praying with the child once, and praying herself for guidance in helping a child on five different occasions.*

A more detailed study of the children's character traits was made by listing all those mentioned for each child in the journal, combining synonyms, and from this list drawing up a rating scale. Each of the five children was then rated on this scale on each trait from zero to four according to frequency or degree of mention of the trait. Zero was used only when the existence of the trait was specifically denied. Otherwise, if no mention was made of the child either possessing or lacking the trait, a blank was used. There were ten traits which were found to be mentioned in the case of one child only. Prima alone was mentioned as "sullen" and "sulky"; Secunda, as "awkward" and "comical"; Tertius, as "gentle"; Quarta as "kind to the baby," "timid," and "vain"; Quentin as "amusing himself well"; and Sextus as "fighting his own battles." These were omitted from a new rating sheet as was also "disobedience" which seemed inappropriate to use on a scale for adults. With these omissions, 35 traits were left.

This new scale was then given to three individuals who were well acquainted with all five survivors and who had agreed to serve as judges. They were asked to omit ratings on any item only when they were quite uncertain about it. The exact words the mother had employed were used in both scales, except that the term "religious" was given to her numerous references to the children's piety. However, her commendations on this item varied somewhat with the child. In Prima's case it was her deep

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interest in the Christianizing of the Chinese that was most often mentioned, but it was their "sincere prayers" and "faith" that won praise for Secunda and Quentin. The judges agreed quite well. In no case did they differ by more than one step on the scale except where one of them had found it necessary to leave a blank and the others did not. The ratings derived from the journal and the pooled ratings of the three judges are shown in Table 7.

Stability of the traits was studied by comparing both the scores received by each subject and the ranks of the five on each trait as a child and as an adult. Before doing this, however, the traits were separated into three groups (see alphabetical groupings in Table 7): according to whether the mother's comment showed that she considered them desirable, undesirable, or questionable. The four neutral traits are found in the middle of the table. The pairs of ratings on nine traits differed in no case by more than one step and in seven other traits there was only one difference greater than one between the two sets of ratings. Consistency, if not stability, was shown for nine other traits, five of which increased and four decreased uniformly with age unless the ratings remained the same. There are only ten traits which vary irregularly, three of which are neutral ones. All changes but two were in the direction of improvement. Judges of the children as adults did not find them quite so interesting as their mother had, but they rated them either the same or higher than their ratings from the journal. As adults their ratings differed consistently from those obtained in childhood in finding them more ambitious, conscientious, persevering, and sympathetic; also less irritable, spunky, and teasing. In fact, none of the subjects was considered still to be a tease.

On fifteen of these stable or consistent traits, the ranks as adults agreed closely with those obtained in childhood, either because the correlation obtained by the footrule method gave an  $r$  of  $+.60$  or more, or if less than four had been rated both times, those left held the same ranks, or if only one was considered to still possess the trait, that one had been rated as the highest in childhood. These traits are *affectionate, attractive, ambitious, bright, conscientious, sympathetic, bossy, contrary, careless, irritable, jealous, nervous, quarrelsome, spunky, and strong-willed*. On six traits there was a lower agreement on both criteria: *brave, exact, interesting, persevering, quick-tempered, and shy*. Although ratings differed for more than one child by more than one point, a low positive correlation for seven other traits exists between the ratings if blanks and zeroes are considered equivalent. These are *happy, religious, neat, chatterbox, fond of dress, imaginative, and selfish*. There is no agreement in rank on five traits: *generous, makes friends, active, sensitive, slow, and helpful*. In fact, the last shows a negative relation between ratings.

A trait score (see the following tabulation) was calculated for each subject by subtracting the sum of the ratings on undesirable traits from the sum of those on desirable ones. This was done for both sets of ratings.

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	<i>Prima</i>	<i>Secunda</i>	<i>Tertius</i>	<i>Quarta</i>	<i>Quentin</i>	<i>Sextus</i>
Child .....	-1	25	4	-17	9	—
Adult .....	3	34	41	-13	28	—

On the trait scores, *Prima* does not show up so well as on the behavior and punishment scores, for her trait scores are both next to the lowest. However, on the omitted trait, disobedience, she tied for third place with *Quentin*, both being three. She also ranks fourth in amount of improvement in ratings. Her mother found her more bossy, jealous, and nervous than the other children and very irritable, but she was also more generous than the rest and very helpful and religious. Except on generosity, her adult ratings on these traits differ on the average by 0.6, on all traits by 0.97.

*Secunda*, whose behavior and punishment scores are both good, received the highest trait score as a child but, not making so great a gain as *Tertius*, is in second place as an adult. She was a lively little chatterbox, "The best of all the children when sick," more often than the rest referred to as bright, conscientious, happy, making friends, but also as more careless, selfish, and at five years, as the most quarrelsome. The average difference of all her ratings when blanks are counted as zero is 0.94, but on her three most marked undesirable traits as a child, the adult ratings averaged 2.3 less.

*Tertius* made the greatest gain of all. His childhood trait score is third higher by one rank than his punishment score and by two ranks than his behavior score if *Sextus* is not considered. Neither he nor *Secunda* were often termed disobedient, but his mother found his habit training so difficult and so delayed that his behavior was often deplored. He was especially affectionate, bright, imaginative, and sensitive or easily teased. He received quite a few ratings of 2 on both desirable and undesirable traits. The average difference between the two sets of ratings for him is 1.40. On only two traits did he receive a less favorable rating as a child than as a man.

*Quarta*, who ranked third on both behavior and punishment scores and was the lowest of the girls on both, ranks last both as child and as adult on trait score. Her rating on disobedience was 4. The average difference in the sets of ratings was 0.94 and the number of ratings that were the same was higher than was the case for any of the others. This is partly due to the more numerous blanks left in both sets. In the adult set more blanks were left for undesirable traits but the opposite was true in the childhood set. When the mother could not name desirable traits for her, she appeared to turn to that feature in which *Quarta* excelled, "She is our prettiest child." She was more often than the rest mentioned as helpful, fond of dress, contrary, fretful or a "cry-baby," selfish, spunky, and teasing, and was at five years "the most quarrelsome."

Like *Secunda*, the mother considered *Quentin* an active little chatterbox. He also liked to dress up and was the tidiest of the children. She found him especially attractive, interesting, and affectionate, and the shyest of all. Al-

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though his behavior and punishment scores were low, he ranks second on trait score as a child, and makes the second largest gain to place third as a man on the trait score. Few of his ratings had been high in childhood so the average difference in rating, despite the large gain in score, is identical with that of two others, 0.94.

Evidently the mother admired the characteristics of her sons, or at least mentioned them more often than the behavior and punishment scores would indicate. Considering only those traits of which the average rating for one sex was at least twice that of the other, the boys, more than the girls, were considered to be affectionate, exact, interesting, neat, persevering, active, imaginative, sensitive, and shy; but less brave, conscientious, helpful, nervous, religious, quarrelsome, selfish, and teasing. The three older children, whose records all cover the eighth year, are more often than the two younger mentioned as bright, ambitious, conscientious, exact, generous, religious, sympathetic, careless, nervous, sensitive, and dilly-dallying, but less often as attractive, neat, fond of dress, contrary, selfish, and spunky. It will be noticed that six of these traits are the same as the ones on which the adult ratings varied in a consistent direction and that they also vary with age in the same direction. The comparative ratings of older and younger in brightness, as with those of the individuals in both childhood and later, are in close agreement with the more objective measures in estimating intelligence when the second category was discussed, which to some extent shows validity of the ratings.

Referring again to punishment to check on its efficacy in improving traits, it is evident that the two children who made the greatest gain were the two of the five most often punished, and Prima who was seldom punished, despite her low trait score, made very little gain. However, Quarta, too, made almost no gain and she was punished almost as often as they, but then her trait score was lower than either of theirs. The mother comments at some time on each child's attitude towards punishment. Of the two who improved so little she writes more than once that Prima was sullen and Quarta seemed impervious. Of the two making the most improvement, she writes that Quentin "loves me much afterwards," and Tertius agreed that he should have been punished (saying once "Or God would punish you," and another time, "I think it was a nice punishment because it kept me from doing it again"). Secunda who made moderate improvement from an originally high score had "great dread of whippings and seldom has to have one." Apparently for punishment to be efficacious, the child's attitude to it was important.

Next, comparison was made of the extent of improvement on the most frequently punished undesirable traits with those seldom or, according to the journal, never punished. In the former group are included strong-willed and contrariness, since they were usually mentioned in connection with refusal to obey, spunky, and quick tempered because of their close association



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with the frequently punished tantrums, selfish and teasing as well as the quarrelsomeness which was their frequent outcome. The average gain on each of these seven traits was 3.9. On the eight other undesirable traits, the gain averaged 1.9, less than half as much. Punishment may have helped. Perhaps the lowering of the score on "strong-willed" was not wholly desirable, for our informant considers that with the possible exception of Quentin, all six as adults are or were insufficiently aggressive. But if "not law-abiding" had been considered equivalent to disobedience and ratings on that trait asked, in his opinion there would have been much lower adult ratings, for, so far as known, none of the five rated ever infringed a law, not even a traffic violation.

But why did Prima and Quarta rate so low and show so little improvement? Prima's undesirable traits, which were still rated fairly high later, were nervous, irritable, jealous, and bossy. The nature of these traits is such as to conceal some very desirable ones. As the firstborn followed by a sister who early caught up with her at school and excelled her in marks, jealousy of her seems a natural consequence. Prima still complains of invidious comparisons with Secunda, primarily made by their teachers. At present, the object of her jealousy has shifted from Secunda to rivals of her children. She finds it necessary to dilate upon their strong points or the handicaps they have to overcome, even to the point of exaggeration. This is probably why her raters found her a greater talker, more imaginative than in childhood, but not interesting. She was inclined to make much of one thing on which her sister could not surpass her, her primogeniture, which she felt gave her a right to boss her younger sibs. She was sometimes delegated this authority too. She was, even before her record closes, participating in public prayer meetings, declaring herself to be "too old to play" with Secunda and Tertius at their favorite games, naming adults as her best friends, and as early as her eighth birthday expressing delight at receiving "grown-up" presents. Part of this early maturity was probably due to the lack of playmates of her own age, but also because of her desire to stress that she was indeed "the oldest." Of the first twenty quotations of Prima's remarks found in the journal, four are preachments to Secunda or the Chinese, and one an indirect one, another a remark that Secunda could do a certain chore now—one that she felt she had outgrown, and eight were questions or remarks concerning death. The last seems a morbid interest for a child not yet five; the others show the early appearance of the trait of bossiness. At the present time Prima is in the worst financial situation of any of the subjects and her life has not been an easy one. More than once she has been in danger of her life in the unsettled conditions of the country to which she returned for many years, after completing her education in the United States.

Although the children as a whole seemed to feel secure, an exception perhaps should be made for Quarta. She arrived at an inconvenient time,

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interfering with furlough plans for visiting and travel. At the close of that year, she was very ill with "cholera infantum." During the furlough and her illness she had the greater share of her mother's care. Then, because her mother became ill, she was turned over to a Chinese nurse, with whom she had hardly become acquainted. During her third year mention is made three times of her breaking the other children's dolls. As it seemed to be done purposely she was punished for that twice. About this time entries begin that mention her clinging to her mother, e.g., "When she is outdoors comes in every few minutes to see me." When Sextus was born, "We had hard work to keep her away from me." When an attempt was made (at the age of 8) to send her with Tertius to boarding school, the principal sent her home because she wet the bed so often. Even in later years she came home three times from different schools and thrice from out-of-town jobs to be with mother. She was a pretty child, and "Everyone speaks about her curls." She liked to dress up and go with her mother, whether calling or to church was not important. That she expected praise is revealed by her statement at four years, seven months when dressing for guests, "I guess they'll think I'm pretty." She still resents her older siblings' refusals at times to let her play with them. But she was not only their junior, she was far behind Tertius in mental maturity. When she was ten she had typhoid fever and so satisfactory was her mother's attention at that time that since then, she has been hypochondriacal, making much of trivial illnesses. In her teens, her siblings found it very inconvenient when Quarta used these complaints as a means of getting out of chores. By the time the family had moved to America, and although as a little girl Quarta had been very willing to "help mama," it was not so much fun now when it meant more than a way of being with "mama." In China she had been the odd one. The two next older and the two younger than she formed very close-knit pairs, and there were not enough age peers for her to find companionship other than with the children of the servants, who let her have her way when she played with them. As a result, she never learned to get along well with other people. She is now very maladjusted, has quarreled with most of her siblings of late years, and rarely sees any of them. She was referred to a psychiatrist a few years ago, but quit treatment after a short period of time. Our informant does not know the diagnosis.

In deriving the interest score (Table 8), those references in the journal were considered that mentioned the child's likes and dislikes. On the positive side are included references to his desires and preferred school subjects, imaginative play, and other activities. On the negative side are his dislikes, fears, and disappointments. The percentage of all these items that fell on the positive side constitutes the interest score. There is some relationship between this score and the childhood rating for happiness. Secunda, who was found happier and less often fretful than the others, ranks second on interest score, and Tertius, who was less often fretful than his other sisters,

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TABLE 8

INTEREST SCORES BY AGE GROUP AND FOR EACH CHILD

<i>Number of Children</i>	<i>Age in Years</i>	<i>Interest Score</i>
4	0 to 1	100
4	1 to 2	100
5	2 to 3	81
5	3 to 4	77
5	4 to 5	81
4	5 to 6	83
4	6 to 7	86
3	7 to 8	85
<i>Name of Child</i>		
Prima	3 to 8	85
Secunda	2 to 8	88
Tertius	0 to 8	90
Quarta	0 to 6-6	83
Quentin	0 to 5	77
Sextus	0 to 3	86

surpasses her by only a little. Prima and Quarta, who both received low ratings on happiness and identical high ones on fretfulness, differ very little on interest scores and are both a little lower than Secunda. Most of Quarta's negative references are to fears. Quentin, however, who was equally often mentioned as fretful and happy, has a low interest score because of meeting more than his share of disappointments.

To compare the interests of the children by studying those things mentioned as desired or enjoyed (not of a transient nature such as a party enjoyed or a specific treat desired), several interests seem surprisingly permanent. Prima's favorite books or school subjects dealt with poetry, astronomy, physiology, and music. Even before she united with the church at nine years, she showed much concern over the conversion of the Chinese and during that same year stated her desire to become a medical missionary. In her imaginative play, her mother mentions her playing doctor twice and once "massacre" after she had heard of another missionary family suffering from one. She explained they were playing the game, "So we will know what to do." Her first attempt at poetry was at six. After nine instead of dramatic play, "She spends much time walking about (when sent outdoors to play) carrying a doll and making up stories." Her first published article was in a child's magazine, which was printed when she was ten. Prima has continued to write occasional poetry and other articles for college and church papers, although she has not made money thereby. She did

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become a missionary, though not a medical one, and has kept up with music as a hobby. However, she has fulfilled her childhood desires more completely in her children, for her son has become a physician and her daughter has had a few musical compositions published.

Secunda was "very fond of reading" when only five and this interest is still a live one. At the same age she "tells many stories in the course of a day," and she, too, had a story printed in the same magazine as Prima, at about the same age. She has had many more published since, although her financial reward has never been great. An interest in riddles and competitive games, first mentioned when she was seven, and a fondness of play in water have also continued in the form of her present hobbies—puzzles, bridge, chess, and swimming. On the other hand, that interest in dramatic play, first mentioned in her third year, and often referred to after that, lapsed in her teens.

Tertius, at three, was very fond of block-building, and from the time he received his first tools on his fourth birthday enjoyed carpentry. Imaginative plays, mentioned most frequently, were first of playing horse, later of soldiers. He also enjoyed drawing, painting, and being read to before he was five. A little later, drawing maps, natural history, arithmetic, darning his stockings, and watching boats interested him. He is now an accountant, and was at one time in the Coast Survey. He is still interested in maps, has made more than a hobby of carpentry, but the drawing and painting in which his mother felt "He certainly has some talent," were not continued.

The only imaginative play initiated by Quarta was "visiting" mother in her fourth year. Her special interest in pretty clothes was first mentioned when she was three. Not long after are the first mentions of her delight in going calling or to church with mother, and her anxiety to be first in some way or to have special attention paid her. She was quite uninterested in lessons except in sewing. She still sews as a hobby, but contrasted to her early desire to go places, she is fairly withdrawn from social activities—a tendency that has increased ever since she lost her looks in an accident when in her late teens.

Quentin, too, enjoyed good clothes and going calling but mention of these interests is less frequent. He enjoyed listening to music and is the only child who ever ran away. As early as two years, ten months, his interest in carpentry is mentioned and is referred to often thereafter. Quentin now follows this trade, enjoys listening to music, though he never learned to play an instrument, and is perhaps the most sociably inclined of the subjects.

None of the dislikes or fears seems to have continued, at least overtly. The younger ones were all afraid of water during their first summer at the seashore. However, seeing the three eldest in the sea, approaching the water gradually with their parents present helped to overcome their fears successfully.

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### QUOTATIONS OF THE CHILD'S REMARKS

The fourth category includes 316 direct quotations<sup>3</sup> of the children's remarks. They were recorded most often during the fourth and fifth years, but began to be frequent for Secunda and Tertius, the more advanced in speech, during the third year. Tertius is least often quoted. As his older sisters and younger brother were all considered to be chatterboxes, he may have been quite correct when he remarked to his mother on an outing when he was her sole companion, "This is such a quiet place that I can talk. I hardly ever have a chance to talk." Almost half of the quotations are of the children's prayers, questions, and remarks of a religious nature, an indication both of the mother's major interest and of the children's training. Aside from Prima's preoccupation with death, these quotations would indicate that their religious teaching was such as to give them a sense of security rather than otherwise.

There are fourteen references to questions and remarks concerning an unborn sibling; e.g., Prima says, "I hope God will give Mama a foreign [Caucasian] baby." Contrary to the custom of the time, the mother not only forewarned the children of a new baby's expected arrival, but she also gave them quite detailed instruction as early as the third year. She told them of the father's part at such an early age that none of them can remember when he first learned of it, and she answered all questions that they asked concerning sex. Although the children were told correct terms for a specific part of the body and its functions, the mother preferred their using the Chinese terms for the expressions usually tabooed at that time.

Relatively, the most questions were recorded for Tertius, the most prayers for Secunda and Quentin, and the most funny errors in speech for Quarta. Since Sextus' record ended at such an early age, the percentage of quotations among other items in his record is very low.

### TREATS, OUTINGS, AND TRIPS

In the fifth category are placed 162 references to the children's treats, parties, travels, and all other outings, except routine ones (i.e., weekly attendance at church). There is a fairly regular increase with age in the percentage of such items. The mother avoided mentioning a treat or outing under more than one child's name, although it was a rare instance for only one child to share in such events. For example, one Christmas, she mentioned the family gift exchange under Prima's name, the tree at the church under Secunda's, and each one of the four parties attended under the name of one of the four younger children. It is impossible to compare accurately the frequency of such outings for the different children, since it is not clear how many or which children were involved on many occasions.

<sup>3</sup> Sample quotations from each child's record from 2½ to 3½ years of age are shown in the Appendix.

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### MISCELLANEOUS

In this category are found the 263 remaining items. The percentage of such items is high in the first year because of many routines peculiar to, or of greater importance, in that year of life. Among such items are baptism, first photographs, the shortening of long dresses, introduction of new foods or methods of feeding, and description of the child's appearance at birth. In the last two years, the increase in miscellaneous items is due to the more frequent inclusion of mention of current events, chores, and gifts given under an older child's name, and the mention of school-room routines, such as daily schedules, date of examinations, and such items not included under Category 2.

### SUMMARY AND CONCLUSIONS

1. In this study use has been made of a journal kept by their mother of six children for a period of eight years. The average number of years covered for each child was six years and nine months. Comparisons could be drawn for from three to five children for each of the first eight years of life.

2. Comparisons have been drawn for each of the six children on some traits as found in early childhood and in adult life and for the five survivors as to their status then and now, 50 years later, on 35 other traits.

3. The children were evenly divided as to sex. If the sexes are separated, the girls maintained their initial birth rank in height. The two longest boys at birth, however, exchanged their rank in height as men.

4. Health scores for each child were derived from the data in the journal. The one with the lowest score died 25 years ago. With one exception, the survivors at the present time maintain the same ranks as to health that they held during the years in which the journal was written.

5. Learning ability in early childhood, as evidenced by progress in learning to read and in the mastery of speech, has been compared with that in adulthood as evidenced by the number of years of education successfully completed and the grades or honors secured in the last years of formal education. Almost identical ranks are held by the subjects on these criteria.

6. A close correspondence also exists between estimated I.Q. levels in childhood and highest occupational level attained.

7. The subjects were rated on 35 character traits from data recorded in the journal and again on the same traits at the present time by three judges whose ratings were pooled for comparison with the earlier ratings.

8. If blanks and zeroes are considered equivalent, 37 per cent of the 165 pairs of ratings are the same, and an additional 33 per cent do not differ by more than one step interval on the five-point scale.

9. On 16 traits at least four of the five pairs of ratings did not differ by more than one step on the scale. On five other traits all differences were in the direction of increase and on four more in that of decrease with age.

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10. On only five traits was there no tendency for the subjects to hold ranks similar to those held in childhood.

11. The adults were given higher ratings on ambition, conscientiousness, perseverance, and sympathy, and lower ratings on irritability, spunkiness, and teasing than they had been in childhood.

12. The most stable or consistent traits both as to ranking and comparative ratings are affection, ambition, attractiveness, brightness, conscientiousness, sympathy, bossiness, contrariness, carelessness, irritability, jealousy, nervousness, quarrelsomeness, spunkiness, and strong will. There was also fair agreement on bravery, exactness, interesting, perseverance, quick temper, and shyness.

13. There was a general trend toward improvement; that is, the ratings on favorable traits tended to increase and those on unfavorable ones to decrease with age. This improvement was considerably greater for the boys than for the girls. An attempt is made to explain the less desirable ratings of the two girls with the lowest scores.

14. The boys were punished more often than the girls and accepted punishment better than they. The better the attitude towards punishment received, the greater the improvement in ratings. The most frequently punished undesirable traits showed greater improvement than did others.

15. A considerable number of interests named in childhood were found to still exist either as hobbies or occupations at present. The earliest interest of a permanent nature, carpentry, was mentioned in the case of one boy as early as two years and ten months.

16. Quotations of the children's remarks were found useful in estimating their comparative intelligence, their mother's major emphasis in training, and throwing light on the children's interests and character.

## APPENDIX

### SAMPLE QUESTIONS FROM 2½ TO 3½ YEARS OF AGE

(Italicized words are Chinese)

Secunda at 2: 5. "Mama takes hypophosphites 'cause she has the whooping-cough."

Tertius at 2: 7. "I can see a little bit of God. Does our God wear any clothes?"

Quentin at 2: 7. "*Ah-ng* no baby, *I-kying* baby." (The Chinese words are his and the baby's names.)

Sextus at 3: 0. "You are a nice mama, the best mama in the world. We all are the best people in the world."

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Prima at 3: 4. "Who is Prima's husband? Where is Prima's husband?"

at 3: 6. "When I die, I want to be buried in a green box; not in a red one like the Chinese."

Secunda at 3: 5. "Is it night in China?"

at 3: 6. "God is inside of my *dubi* and inside of all people's *dubis*. Then there are lots of Gods, lots of Jesus."

Tertius at 3: 7. "If God took two to heaven, wouldn't it be funny?"

at 3: 9. "If somebody gave Secunda two apples and me five, how many would that make?"

Quarta at 3: 5. (Referring to her shadow) "Why Quarta walk on the floor?"

at 3: 7. "Did I help you, mama?"

Quentin at 3: 5. "Kitty has some nipples. She has milk inside her. I get some for baby."

at 3: 5. Prays, "Please don't let Satan tell me play in the water. Don't let me mind him."



## TIME SCHEDULE FOR THE APPEARANCE AND FUSION OF A SECOND ACCESSORY CENTER OF OSSIFICATION OF THE CALCANEUS

VERNETTE VICKERS HARDING

In connection with a longitudinal study of child health and development conducted in recent years by the Department of Maternal and Child Health at the Harvard School of Public Health, roentgenograms of various areas of the body have been taken on a group of children from birth to fourteen years (1).

The writer has studied these films from the standpoint of the time of appearance and fusion of various osseous centers and has presented norms based upon these studies for use in the appraisal of osseous development.

During the course of these studies it has been observed that a second small accessory center of the calcaneus appears regularly, superior to and considerably later than the first. Although it has been recognized that the calcaneus frequently has multiple accessory centers, the regular development of the one being described and its practical value in the assessment of osseous development have not received attention. The value of observing this center as an additional indicator arises from the fact that it appears and develops during a period in which relatively few other centers are useful. For this reason, the author has worked out the time schedule for this center, derived from the series of roentgenograms referred to. For purposes of identification, the accessory calcaneus generally recognized is referred to as No. 1 and the center being described is referred to as accessory calcaneus No. 2.

Accessory calcaneus No. 1 usually appears between the ages of  $4\frac{1}{2}$  and 6 years in girls and between 7 and  $8\frac{1}{2}$  years in boys. It is frequently irregular both in outline and in density of ossification. Its location and appearance, when well developed but before fusion with the body of the calcaneus, is shown in A, Figure 1. Accessory calcaneus No. 2 rarely appears before 10 years in girls and 11 years in boys, usually between  $10\frac{1}{2}$  and 12 in the former and  $11\frac{1}{2}$  and  $13\frac{1}{2}$  in the latter. It appears first as a long thin line directly superior to but entirely separate from the primary accessory center, as shown in drawing B, Figure 1. During the following year it enlarges primarily in width as shown in C. In about three years after its appearance, it fuses with the body of the calcaneus as indicated in D. Thereafter, it quickly joins the accessory calcaneus No. 1 which has already fused with the body of the bone.

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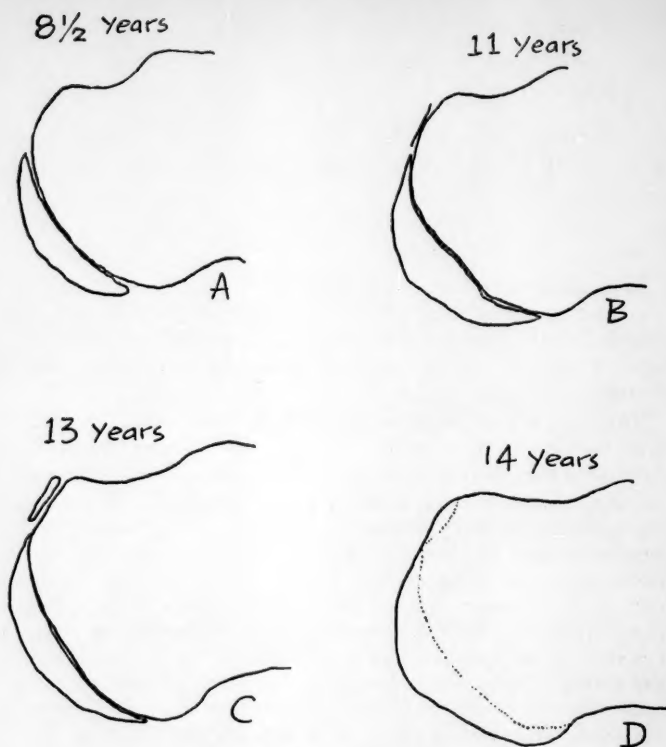


FIGURE 1—Accessory centers of calcaneus for girls.

TABLE I  
APPEARANCE OF ACCESSORY CENTERS OF CALCANEUS

	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs
Girls												
Accessory #1	1	6	38	79	93	100						
Accessory #2							1	13	39	73	90	100
Boys												
Accessory #1			1	5	16	61	85	99	99	100		
Accessory #2								4	11	27	56	79

# VERNETTE VICKERS HARDING

Table 1 gives the percentage of girls and boys showing each of the accessory calcaneus centers at succeeding years of age. It is of interest that in all but one instance the second center was first visible in girls between 10 and 14 years or during the years in which a major portion of girls reach menarche. For this reason the age of appearance and the age of fusion of this center has been studied in relation to the age of menarche for the entire group. Figure 2 shows the percentage of girls who had attained each of these stages at each year of age. It will be seen that the center appears in the majority of instances between one and one an one-half years before menarche and is fused about one year after menarche.

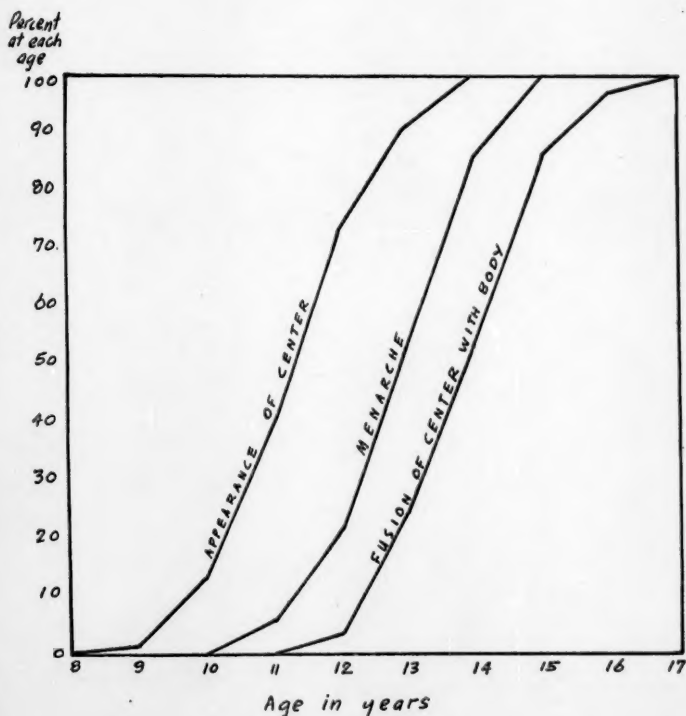


FIGURE 2—Age of appearance and fusion of the accessory calcaneus No. 2 compared with the age of menarche.

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# THE EFFECTS OF FEEDING, WEANING, AND SCHEDULING PROCEDURES ON CHILDHOOD ADJUSTMENT AND THE FORMATION OF ORAL SYMPTOMS

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Psychoanalysts and psychoanalytically oriented psychologists, psychiatrists, and pediatricians have frequently stressed that the infant's early feeding experiences have special significance for the determination of certain adult personality characteristics (e.g., dependence, pessimism, hostility) and for the formation of certain symptoms such as finger-sucking, nailbiting, and stuttering, which are generally considered to be expressions of "conflicts around oral-erotic impulses" (2, p. 491). The development of the so-called oral personality and/or symptoms indicative of oral conflict and frustration may best be avoided, according to the analytic writings, if the infant finds his early feeding experiences gratifying. Breast feeding, a prolonged period of nursing, gradual weaning, and self demand schedules have been recommended as means of promoting feeding gratification and, thus, secure symptom-free personalities.

In general, systematic and empirical studies have failed to support these analytic notions. After an extensive review of the relevant experimental literature, Orlansky concluded that "a specific discipline does not exert a specific invariable psychological influence upon the child" (6, p. 7).

Most of the studies reported in the literature have been concerned with the relationship between certain aspects of feeding experience and general characteristics of childhood and adult personality such as timidity (7), intelligence (4), confidence (7), security (5), affection (7), and personality traits (12). Only two studies (1, 9) have been concerned with the presence or absence of "oral symptoms" in children. Moreover, only the psychoanalytic hypotheses concerning breast feeding have been investigated with large groups of subjects; the influences of the type of weaning procedures used (gradual or abrupt) and feeding on demand or regular schedules have not been systematically studied. In concluding their own study on the effect of length of breast feeding on childhood personality, Peterson and Spano conclude: "Since duration as such shows no relationships (with personality),

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we can now proceed to a study of other aspects of the early feeding period in the search for influences on later personality" (8, p. 64).

The present study attempts to relate three independent aspects of early feeding behavior—(a) type of feeding (breast or bottle), (b) nature of the feeding schedule (demand or regular), and (c) nature of the weaning process (sharp or gradual)—to childhood personality characteristics and adjustments and to specific symptoms generally considered to be indicative of oral-erotic conflicts.

Specifically, three major hypotheses derived from psychoanalytic theory will be tested:

*Hypothesis 1.* Since breast fed children suffer fewer oral frustrations than those who are bottle fed, breast fed children will be generally better adjusted and have fewer oral symptoms.

*Hypothesis 2.* Since feeding on a demand schedule permits freer, more pleasurable sucking experiences (and consequently more oral gratification), children fed on this kind of schedule will be generally better adjusted and have fewer oral symptoms than those fed on a regular schedule.

*Hypothesis 3.* Since gradual weaning would be less traumatic than abrupt weaning, children weaned gradually will be generally better adjusted and display fewer oral symptoms than those weaned abruptly.

### SUBJECTS AND PROCEDURE

The data on which the present paper is based were collected as a part of an extensive study of child training and personality development conducted by the senior author who has discussed the major methodological problems in a previous paper (10). The subjects of the study were 162 rural Wisconsin five- and six-year-old children who came from middle class native American families. Thus, gross occupational and socio-economic influences were controlled. Only the natural children of unbroken and never broken unions were selected so that there would be no group differences which might be attributable to disruption in the family situation.

The data on infant training practices were obtained from an intensive personal interview with the mother. The interview was conducted in the home of the child by a highly trained interviewer using guided interviewing techniques. The interview actually covered many aspects of parent-child relations and community relations, but particular attention was devoted to the child training procedures used in the family and to the personal adjustment of the subject in the family situation.

The criteria of adjustment were of three types: (a) As noted above, the interview with the mother provided some data on the child's personality. This included information on 13 specific behavior manifestations related to personal adjustment. Seven of them involved oral symptoms (stuttering, nailbiting, slowness in learning to talk, bashfulness about talking, finger

sucking as a baby, finger sucking at present, eating difficulties) and six of them reflected general social and personal adjustment (frequency of temper outbursts, general temperament, frequency of "hurt feelings," fears displayed, arguing, fighting). (b) The California Test of Personality, Primary Form A, (11) was administered to each child by a trained clinician who tested the children early during their first year in school. For present purposes, nine component scores derived from these tests were used: Freedom from Anti-social Tendencies, Self-reliance, Personal Worth, Personal Freedom, Feeling of Belonging, Freedom from Withdrawing Tendencies, Freedom from Nervous Symptoms, General Social Adjustment, and Total Adjustment. (c) Using the Ford Modification of the Haggerty-Olson-Wickman Behavior Rating Scale (3), the children's teachers made ratings of the children on Acceptance of Authority, Reaction to Frustration, Self Assertiveness, and Emotional Adjustment.

In evaluating the test scores and the teachers' ratings, previously derived standards or norms were not used. Instead, frequency distributions were constructed for each individual test component and each rating scale, and it was assumed that those who made scores or ratings in the top half of the distribution were better adjusted as a group than those who made scores which placed them in the lower half of the distribution. Responses on the individual behavior items taken from interviews with the mother were classified simply as favorable or unfavorable.

The data on child rearing practices and feeding gratification, on the one hand, and the test results, ratings, and behavioral items, on the other, made possible the testing of the three analytic hypotheses. Substantiation of these hypotheses would require that each of the oral symptoms and test scores, teachers' ratings, and behavioral manifestations indicative of poor adjustment occur with greater frequency among the bottle-fed, abruptly weaned, and regular-schedule-fed children than among the those who were breast-fed, gradually weaned, and demand-schedule fed.

#### RESULTS

Chi-square tests were used to determine whether or not there was a significant relationship between good or poor adjustment on each of the 26 adjustment or symptom items and gratification or non-gratification with respect to each of the three criteria. Thus, there were 26 four-fold tables for each feeding gratification item or 78 for the three items.

Hypothesis 1 was tested by determining whether or not good adjustment was positively related to breast feeding. Only 103 of the 162 subjects were used in testing this hypothesis because only those who were exclusively bottle fed or exclusively breast fed were used in the comparison. This, of course, makes the comparison more clearcut.

Columns 2 and 3 of Table 1 present the number of breast fed and bottle fed subjects showing the *poorer* score on each of the 26 adjustment (in-

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TABLE I  
RELATIONSHIPS BETWEEN FEEDING GRATIFICATIONS IN INFANCY  
AND POORER CHILDHOOD ADJUSTMENT\*

<i>Criteria of Adjustment</i>	<i>Breast Fed</i> (N=60)	<i>Bottle Fed</i> (N=43)	<i>Demand Fed</i> (N=52)	<i>Regular Fed</i> (N=110)	<i>Gradually Weaned</i> (N=139)	<i>Abruptly Weaned</i> (N=23)
<b>I. From Interview Data</b>						
<i>a. Oral Symptoms</i>						
1. Finger sucking Now ....	8	4	7	13	17	3
2. Finger sucking as Baby ..	21	8	14	40	45	9
3. Nailbiting .....	10	5	12	17	27	2
4. Stuttering .....	4	5	6	14	19	1
5. Eating Difficulties .....	24	20	22	52	62	12
6. Slow in Learning to Talk	6	5	6	11	17	0
7. Bashful About Talking ..	19	18	17	40	49	8
<i>b. Behavioral Manifestations</i>						
8. Bad Tempered .....	10	7	9	21	26	4
9. Temper Outbursts .....	7	6	5	17	18	4
10. Feelings Hurt .....	29	17	22	50	59	13
11. Fears Displayed .....	22	19	20	50	60	10
12. Arguing .....	13	10	10	27	32	5
13. Fighting .....	4	6	6	11	14	3
<b>II. From California Test</b>						
14. Feeling of Belonging ....	26	19	26	39 <sup>†</sup>	51	14 <sup>†</sup>
15. Personal Worth .....	37	28	32	60	77	15
16. Personal Freedom .....	23	17	22	38	49	11
17. Self-Reliance .....	32	18	21	45	56	10
18. Freedom from Anti-Social Tendencies ....	29	20	26	46	61	11
19. Freedom from Withdrawing Tendencies ..	29	20	28	45	62	11
20. Freedom from Nervous Symptoms .....	26	21	20	47	55	12
21. Social Adjustment .....	31	20	26	47	61	12
22. Total Adjustment .....	36	26	32	62	79	15
<b>III. From Teachers' Ratings</b>						
23. Acceptance of Authority .	32	20	27	58	72	12
24. Reaction to Frustration ..	23	15	22	34	45	11
25. Self-Assertiveness .....	21	14	21	38	51	8
26. Emotional Adjustment ..	21	11	16	36	42	10

\* For the complete distributions upon which this table is based, order Document 3623 from American Documentation Institute, 1719 N Street, N.W., Washington 6, D.C., remitting \$1.00 for microfilm or \$1.50 for photocopies readable without optical aid.

<sup>†</sup> Significant at or beyond the 5 per cent level.



cluding oral symptoms) measures. None of the Chi-square values computed in testing the relationships between type of feeding and the criteria of adjustment is statistically significant. (The 5 per cent level is used as the criterion of statistical significance.) The results do not support Rogerson and Rogerson's (9) conclusions that children who have been artificially fed in infancy experience more feeding difficulties, fears, or nervousness later on than children who have been breast fed or Hoefer and Hardy's (4) findings that bottle fed children are slower in learning to talk. The findings are entirely consistent with Orlansky's statement that "there is no evidence to favor the current belief among some pediatricians that breast feeding is inevitably more advantageous to the child than artificial feeding" (6, p. 5).

In testing the second major hypothesis, the subjects were divided into (a) those who, according to their mothers' reports, had been fed on a regular schedule which was always adhered to and (b) those who were not fed on such a schedule. Actually the latter group includes very few cases which were not completely of the demand type. In a few instances the mother reported that she had attempted to keep a regular schedule but deviated from it so often that in our judgment it could not be classified as a regular schedule. Hence the second group can be accurately described as a demand schedule group.

Columns 4 and 5 of Table 1 show the number of regular and demand fed children who showed a poor adjustment on each of the 26 criterion measures. Only one of the Chi-square values computed in testing the relationships between adjustment and type of feeding schedule is statistically significant. A relatively greater proportion of children who were fed on a *demand* schedule scored low (i.e., more maladjusted) on the Feelings of Belonging Component of the California Test of Personality. Moreover, the one statistically significant Chi-square value shows a result contrary to the prediction made on the basis of the theory, since, according to the theory, those fed on the demand schedule should more frequently show scores indicative of better rather than poorer adjustment.

Thus the conclusion with respect to the second hypothesis is similar to that concerning the first: There is no evidence of any significant relationship between the method of scheduling an infant's feeding and (any of the measures of) personal and social adjustment. There is no evidence that those children fed on a regular schedule are more maladjusted or have more "oral symptoms" than those fed on a demand schedule.

Testing the third general hypothesis required categorizing each child as abruptly or gradually weaned. The interview data indicated that most of the children were gradually weaned; that is, the child was fed soft food over a period of weeks or months before he was removed completely from bottle or breast. Those children classified as abruptly weaned were taken off breast or bottle feeding and put on other types of foods without any attempt to shift gradually from one type of feeding to the other. Columns

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6 and 7 of Table 1 present the numbers of abruptly weaned and gradually weaned children showing the poorer adjustment on each of the 26 criterion measures of adjustment.

Only one of the Chi-square values computed in testing the relationships between types of weaning as here defined and personality adjustments is statistically significant, and here again it concerns the *Feeling of Belonging* score from the California Test of Personality. In this case, however, the results are what would have been predicted on the basis of theory: A greater proportion of those who were abruptly weaned (and therefore suffered greater weaning trauma) scored low in this trait. However, one statistically significant Chi-square value out of a possible 26 cannot be taken as support for the hypothesis being tested. Actually, the commonly accepted practice in matters of this kind is to expect 5 per cent of the relationships to be significant on the basis of chance alone.

Thus, the analysis of the data leads to the conclusion that there is no significant relationship between abrupt or gradual weaning and maladjustment as measured in this study.

### SUMMARY

The present investigation was designed to test empirically three psychoanalytic hypotheses concerning the effects of feeding frustrations on general adjustment and the presence or absence of "oral" symptoms. An attempt was made to relate three aspects of feeding behavior (breast or bottle feeding, demand or regular schedule, and abrupt or gradual weaning) to a number of symptoms indicative of "conflicts around oral-erotic impulses" and to other measures of adjustment or maladjustment.

The subjects investigated were 162 five- and six-year-old rural children coming from unbroken, native American, middle class homes. Data on feeding behavior and some behavioral manifestations of general personality adjustment were derived from intensive interviews with their mothers. Results on the California Test of Personality and teachers' ratings gave further information about personal and social adjustment.

Using Chi-square tests, an attempt was made to relate oral symptoms and behavior manifestations, test scores, and teachers' ratings indicative of maladjustment to gratification and non-gratification in each of the three aspects of feeding activity. In all, 78 Chi-square tests were made. Of these, only two yielded Chi-square values which were statistically significant. By commonly accepted standards this is fewer than might be expected on the basis of chance alone. Moreover, the two significant Chi-squares were in the opposite directions, i.e., one was consistent with the prediction based on the theory, while the other was not.

The results of this investigation, therefore, give no support to psychoanalytic thinking which maintains that breast feeding, demand schedules, and gradual weaning promote better adjustment than bottle feeding, regular

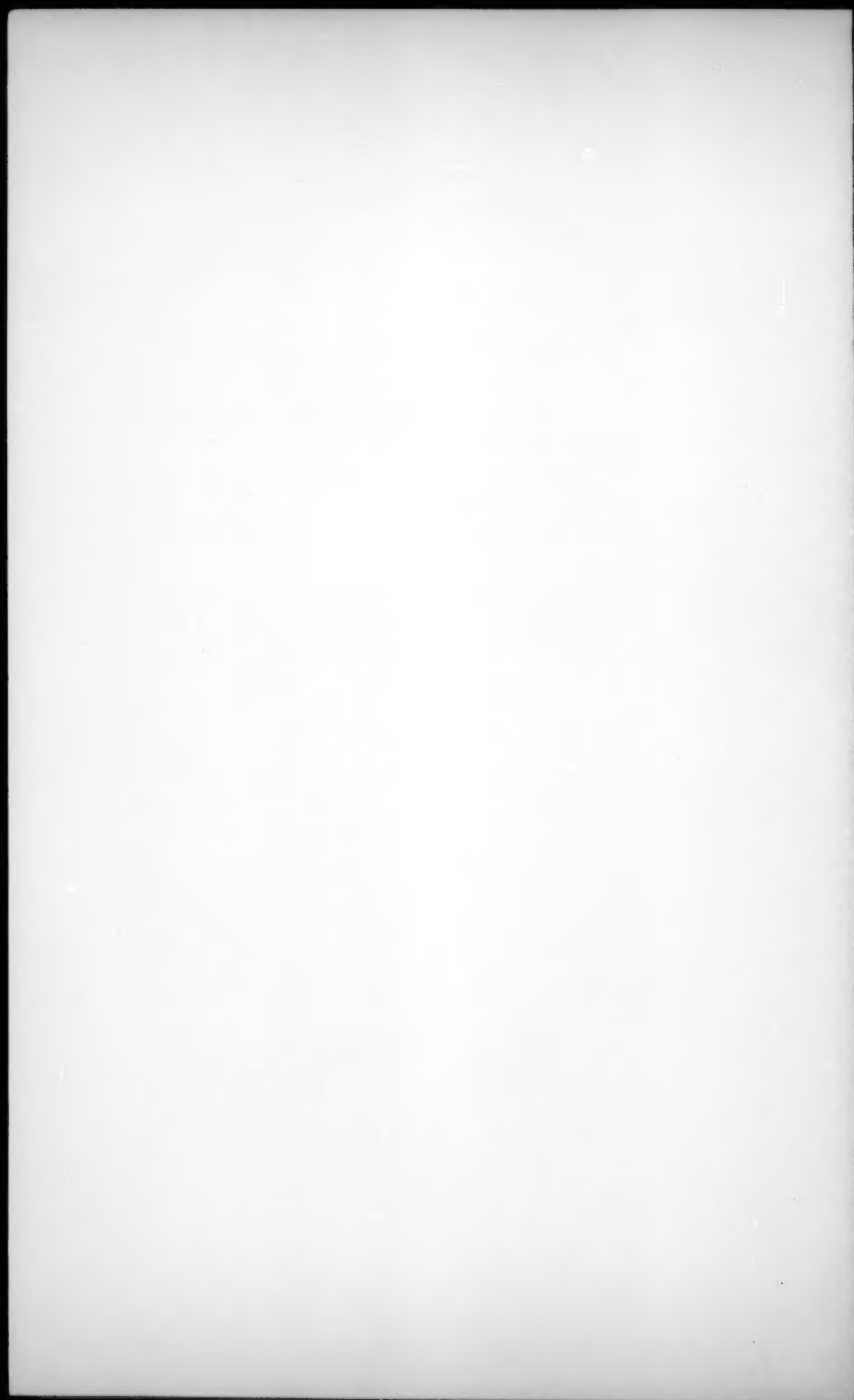
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scheduling, or abrupt weaning. Analysis of the data provides no evidence that one method of feeding, scheduling, or weaning is superior to other methods. In fact, there is no evidence from this study of any relationship between gratification or non-gratification in any of these three aspects of the feeding process and personal and social adjustment.

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# INDIVIDUAL AND GROUP DEVIATIONS FROM "CHANNELWISE" GRID PROGRESSION IN GIRLS

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## INTRODUCTION

In 1941, N. C. Wetzel introduced "a new method for evaluating physical fitness" (13), a method based upon a grid, which has since come to be known as the Wetzel Grid, or more simply, as the "Grid." While the grid method employs only the minimum data of age, height, and weight, it represents a methodological advance over previous systems, in the way these three variables are related. The grid plot is logarithmic, weight is plotted against height (rather than separately) to provide a measure of physique, and from the combination of weight and height, surface area and hence basal heat production can at least be estimated. Finally, the grid contains a series of parallel lines, delimiting nine physique "channels," for use in following the growth of children of different physical types.

These "channels" are a basic feature of the grid system. They represent dimensional paths along which children may be expected to proceed under normal (or optimal) conditions. This basic philosophy is carefully outlined in the original publication, and the idea of channelwise progression is illustrated by selected examples. In short, "healthy development continues in an established channel, as though this were a preferred path." "The channels are straightline paths for the duration of school life, that is from 6 to 18 years and beyond" (13, p. 1189). "Final settling in a channel may be delayed a year, but only in exceptional cases will this be later than the age of 8 years." "It may be stated as a simple and practical rule, that normal variations do not exceed one-half channel per 10 units of development." These quotations are selected to illustrate the basic doctrine of channelwise progression, the age at which the channel course is expected to become evident, and the tolerance limits (boundaries) that delimit normal growth.

Accepting the idea of channelwise progression, spelled out in 1941 and repeated in later publications (14, 15, 16), the utility of the grid is obvious. It can be used to plot growth deviations, the effects of endocrinopathy or malnutrition, and the success of various therapeutic measures. Again, as-

<sup>1</sup> The author is grateful to Dr. H. C. Stuart for permission to use data compiled by the Longitudinal Study of Child Growth and Development, to Drs. E. E. Hunt, Jr., V. O. Hurme, and R. Reed for technical advice and assistance, and to Dr. Eli Jensen for careful translations from the Danish literature.

A grant from the Charles H. Hood Dairy Foundation made the present study possible.

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suming that straightline channelwise progression is indeed the usual hominid pattern, and normal deviations are small, the grid becomes even more valuable, for then it can be used to discriminate between healthy growth and normal variation on the one hand, and abnormal growth and pathological variation on the other.

In recent years the grid has been used, by Wetzel and others, to illustrate abnormal growth behavior on the part of children with known dietary deficiencies, endocrinopathies, allergies, infections, and emotional disturbances (2, 3, 6, 7, 8, 14, 17), and there is little doubt that it is well suited to this purpose. However, Wetzel has not published data on the growth patterns of clinically-healthy children, and there is nothing to show the extent to which such children may deviate from channelwise growth, or the proportion of children who actually do so. There is little doubt that Wetzel has considered this problem, for he wrote in the 1941 publication: "As a further check the grid method has been tested on the voluminous data from the materials of the Harvard growth study by Dearborn and his co-workers, on the data of several smaller series, and finally against the mean values of more than 400 reports in the literature dealing with growth and nutrition of large groups of children under various conditions" (13, p. 1194). However, the results of these tests have not been described.

The question then remains open as to the constancy of channelwise progression, the amount of deviation, and the frequency of such deviation in actual practice. American evaluations of the grid have been concerned with other aspects: the relative weighing of stature and weight, the validity of the basal heat scales for extreme physiques, and the grid as a measure of maturation (2, 6, 9). Danish studies, on the other hand, have raised the possibility that constancy of channelwise progression does not exist, at least for Danish children (1, 4), though one study at least may be considered as unduly critical in that minor deviations are somewhat overemphasized.

It is the primary purpose of this paper to consider the problem of constancy of channel position, and the converse problem of the frequency and extent of deviations from channelwise course. Two series of girls have been investigated in an effort to resolve the problem. The first series consists of a group of girls followed for a long time period in order to determine whether actual growth patterns are "straightline paths for the duration of a school life." The second series consists of a group of girls followed for a short time period in order to determine whether variations from straightline progression are randomized, or whether they follow a systematic course in relation to age. Obviously these problems bear on the ability of the grid to discriminate between "normal" and "abnormal" growth.

### MATERIAL

The present study is based on a total of 97 girls, all residents of Boston or surrounding communities, and predominantly of northwest European

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origin.<sup>2</sup> Of the total, 32 were participants in the Study of Child Health and Development directed by Harold C. Stuart, and 65 (including four sets of twins) were enrolled in the Forsyth Growth Study. The first group, which consisted of girls who had been followed from birth on, was used to investigate constancy of channel position between the sixth and the sixteenth years of life. The second group of girls, who have been followed for two to four years at Forsyth, was included to explore one-year changes in channel position and changes at different age levels.

Since the methods and materials of the Harvard Study of Child Health and Development have been described elsewhere (12), further description of the longitudinal series is not necessary here. The girls in the Forsyth Study selected for use in this investigation were all clinically healthy, free from known or suspected pathosis. Probable cases of growth abnormality, as shown by the pediatrician's examinations and the case records, were carefully excluded.

### METHODS

Using height, weight, and age data from the record cards, the Wetzel channel position of each girl at each age level considered was plotted on a recent version of the Grid (copyright date 1948). Data on the girls from the Harvard Growth Study were obtained from the longitudinal records, compiled and maintained at the Harvard School of Public Health. Data on the girls from the Forsyth series were copied from the authors' record cards. In both groups stature was measured without shoes, weight as recorded was nude weight in the Harvard Study and nude weight plus the weight of a hospital gown in the Forsyth series.

Since the Harvard Longitudinal Study scheduled each annual examination to coincide closely with the subject's birthday, there was no problem in assigning the age levels or in computing changes at yearly intervals. In the Forsyth Study, on the other hand, examinations were scheduled without reference to the subject's birth date but with consideration for examinations at regular intervals. In this group the mean elapsed time between examinations was 11.9 months with a standard deviation of  $\pm 1$  month. For practical purposes then, this group was followed for a one-year period.

In most instances, the Wetzel channel position was recorded as plotted on the grid. In a few cases, the plot fell on the dividing line between two channels. Rather than following any arbitrary rule in such cases, the previous and subsequent grid positions were taken into consideration, and the channel position assigned was that making for a minimum deviation

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<sup>2</sup> Here, as with traditional growth charts, sex differences in growth rate and maturation make it advisable to restrict the study to members of one sex. A separate study of channelwise growth in boys is now being completed.

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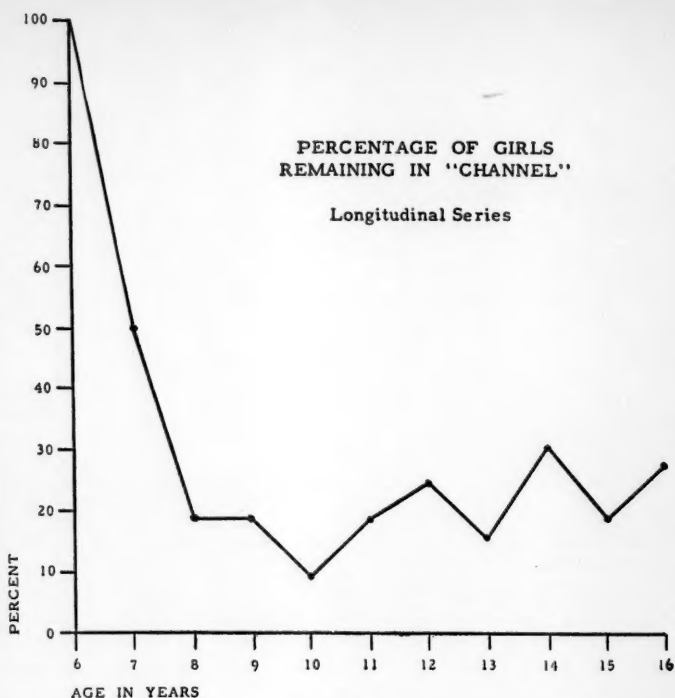


FIGURE 1

or no deviation at all. In this way minor, unimportant deviations were ignored.<sup>3</sup>

### FINDINGS ON THE LONG-TERM STUDY

Data on the series of 32 girls from the Harvard Study of Health and Development were analyzed by determining the "starting channel" for each girl (channel position at age 6), and then noting, at each age-interval, whether or not she remained in this channel. Girls who had previously departed from the starting channel, but subsequently returned, were counted as in-channel. In addition, the channel distribution of the entire series was plotted at each age level, and the mean, modal, and median channel positions were computed. In this way it was possible to determine (a) the proportion of girls remaining in the starting channel at each age level and (b) age changes in the distribution pattern.

<sup>3</sup> See Dössing (4) p. 699.



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TABLE 1

MODAL, MEDIAN, AND MEAN CHANNEL POSITIONS FROM 6 TO 16 YEARS

	Age:	6	7	8	9	10	11	12	13	14	15	16
Modal Channel . .	M	M	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	M	M	M	M	
Median Channel .	M	M	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	M	M	M	A <sub>I</sub>	
Mean Channel . .	M	M	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	M	M	M	M	

As shown in Figure 1, the proportion of girls in the starting channel (by definition 100 per cent at age 6) dropped to 50 per cent at age 7 and to 19 per cent at age 8. Thereafter it fluctuated somewhat (to the extent accountable for by chance), but at no time after age 7 were more than 11 of the 32 girls in the starting channel, regardless of whether they had remained in-channel or had returned to the starting channel after deviating.

While this argued against straight-line channelwise progression from 6 to 16 years, it did not show whether the deviations were at random, or whether they were systematic. However, the record of mean, modal, and median channels for each age level served to illuminate this question. As shown in Table 1, the modal channel remained at M from 6 to 8, dropped to B<sub>I</sub> from 9 to 12, and then rose thereafter (reaching A<sub>I</sub> in the 17th year). On a group basis, therefore, there was evidence of a down-channel shift in the earlier years and an up-channel shift in the later years.

Reviewing the individual growth patterns, it was obvious that, despite fluctuations, such a pattern was characteristic of individual girls, as well as the group as a whole. One of the most consistent girls in the long-term series (No. 3) remained in a single channel for as much as four years, yet she followed an arcuate or trough-shaped pattern on the grid (Table 2). One of the most variable girls, (No. 181) remained in a single channel for only two years at most. Yet her grid pattern also showed an early loss of channel position and subsequent "recovery" (Table 2). And finally, one

TABLE 2

CONSISTENT, VARIABLE, AND TROUGH-SHAPED GRID PATHS SELECTED FROM THE LONGITUDINAL SERIES

	Age:	6	7	8	9	10	11	12	13	14	15	16
1. Consistent path (No. 3) . . . . .	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	B	M	M	M	A <sub>I</sub>	A <sub>I</sub>	A <sub>I</sub>	
2. Variable path (No. 181) . . . . .	A <sub>I</sub>	M	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>2</sub>	B <sub>I</sub>	B <sub>2</sub>	M	B <sub>I</sub>	M	
3. Trough-shaped path (No. 138) . . . . .	A <sub>I</sub>	M	M	B <sub>I</sub>	B <sub>I</sub>	B <sub>I</sub>	M	M	A <sub>I</sub>	A <sub>3</sub>	A <sub>3</sub>	

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extreme girl (No. 138), who moved downward two channels in four years and later gained three channels in three years, illustrates the trough-shaped pattern to an extreme.

The long-term Harvard Growth Study series failed to follow a straight-line progression, but, rather than exhibiting purely random deviations, tended to follow a trough-shaped path on the grid, a path characterized by

TABLE 3  
ONE YEAR CHANGES IN CHANNEL POSITION (FORSYTH SERIES)

YOUNGER GIRLS						OLDER GIRLS					
Case No.	Age	Channel	Age	Channel	Net Change	Case No.	Age	Channel	Age	Channel	Net Change
1 R.N.	6-0	M	7-1	A1	+1	35 M.R.	10-0	B1	11-1	B2	-1
2 N.N.	6-0	A3	7-1	A1	-2	36 J.F.	10-1	B2	10-11	B3	-1
3 K.D.	6-0	M	7-1	B1	-1	37 T.M.	10-1	A1	11-3	A1	0
4 M.B.	6-1	B2	7-0	B2	0	38 A.B.	10-4	B3	11-4	B3	0
5 L.H.	6-3	M	7-5	M	0	39 A.M.	10-4	B3	11-3	B4	+1
6 G.B.	6-3	A1	7-5	A1	0	40 B.A.	10-5	B2	11-5	B1	+1
7 E.N.	6-4	M	7-5	B2	-2	41 L.W.	10-6	A2	11-4	A2	0
8 A.T.	6-4	A1	7-6	M	-1	42 F.D.	10-6	B4	11-4	B3	+1
9 M.C.	6-9	M	7-9	B1	-1	43 R.M.C.	10-6	A2	11-7	A2	0
10 J.N.	6-11	B2	7-10	B2	0	44 B.T.	10-7	A4	11-6	A4	0
11 E.K.	6-10	A4	7-10	A2	-2	45 S.M.	10-11	B2	11-9	B2	0
12 J.W.	7-0	M	8-2	M	0	46 J.K.	11-0	B1	11-11	B1	0
13 P.H.	8-2	B1	9-5	B2	-1	47 K.H.	11-0	B1	12-0	M	+1
14 S.S.	7-3	A1	8-4	B1	-2	48 M.F.	11-4	B2	12-5	B1	+1
15 E.B.	7-5	B3	8-2	B4	-1	49 W.O.B.	11-5	B2	12-8	B2	0
16 M.M.	7-5	B1	8-3	B1	0	50 E.M.C.G.	12-0	A3	13-0	A4	+1
17 M.C.	7-8	M	8-10	M	0	51* E.M.	12-1	B2	13-0	B1	+1
18 F.I.	7-9	A1	8-8	A1	0	52* M.M.	12-1	B2	13-0	B1	+1
19 J.F.	7-10	B4	8-8	B4	0	53 L.W.	12-2	M	13-1	A1	+1
20 M.M.	8-0	B1	8-11	M	+1	54 M.M.	12-5	B2	13-5	B1	+1
21 M.D.B.	8-0	M	9-3	M	0	55 B.L.F.	12-6	B2	14-4	B2	0
22 B.S.	8-3	B1	9-3	B1	0	56 J.B.	12-8	M	13-6	B1	-1
23 A.O.K.	8-6	B1	9-8	B2	-1	57 M.B.	12-9	A1	13-9	A3	+2
24 K.K.	9-4	M	10-2	B1	-1	58 E.B.	12-10	M	14-1	A1	+1
25 C.H.	9-4	B4	10-3	B4	0	59 M.M.	12-11	B3	13-10	B2	+1
26 H.M.C.G.	9-4	M	10-5	B1	-1	60* E.J.	13-1	B4	14-2	B3	+1
27* P.R.	9-5	B1	11-4	B1	0	61* E.I. J.	13-1	B4	14-2	B3	+1
28* P.R.	9-5	A1	11-4	M	-1	62 L.D.	13-4	B1	14-4	B1	0
29* C.J.	9-7	B4	10-6	B2	+2	63 M.L.S.	13-5	A1	14-3	A1	0
30* D.J.	9-7	B3	10-6	B2	+1	64 A.C.	13-10	A3	15-0	A4	+1
31 C.A.	9-7	B1	10-7	B1	0	65 G.C.	13-11	A2	14-7	A3	+1
32 M.C.	9-8	B1	10-8	B1	0						
33 D.W.	9-9	A1	10-6	A2	+1						
34 M.F.S.	9-9	A4	10-9	A4	0						

\* Twins

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early loss of channel position and later gain. This pattern suggested either (a) long-term socio-economic influences or (b) changes normally associated with growth and development and not corrected for by the grid.

TABLE 4  
SHORT-TERM CHANGES IN "CHANNEL" POSITION  
(FORSYTH SERIES)

	Lost Position		Held Position	Gained Position	
	-2	-1	0	+1	+2
Number .....	4	12	27	20	2
Per Cent .....	6.1	18.5	41.5	30.7	3.1

## FINDINGS OF THE SHORT-TERM STUDY

Data on the 65 girls from the Forsyth series were investigated, first *en masse*, and later after division into a younger age group and an older age group. As shown in Tables 3 and 4, the prevailing pattern was a shift in channel position; a total of 38 of the 65 girls (58.4 per cent) had either lost or gained channel position, while only 27 (41.5 per cent) held position. Of the group, 16 (24.6 per cent) lost channel position, while 22 (33.8 per cent) gained channel position. Six (9.2 per cent) had shifted more than one channel. Thus, even on a short-term one-year basis, more girls shifted channel position than held channel position.

When the series was divided into a younger group of 34 girls and an older group of 31 girls, a striking age difference in the pattern of shifting was observed (Table 5). In the younger group, 13 of the 34 girls lost

TABLE 5  
SHORT-TERM CHANGES IN "CHANNEL" POSITION  
(YOUNGER GIRLS VS. OLDER GIRLS)

	Lost Position	Held Position	Gained Position
<i>34 Younger Girls</i>			
Number .....	13	16	5
Per Cent .....	38.2	47.1	14.7
<i>31 Older Girls</i>			
Number .....	3	11	17
Per Cent .....	9.7	35.5	54.8

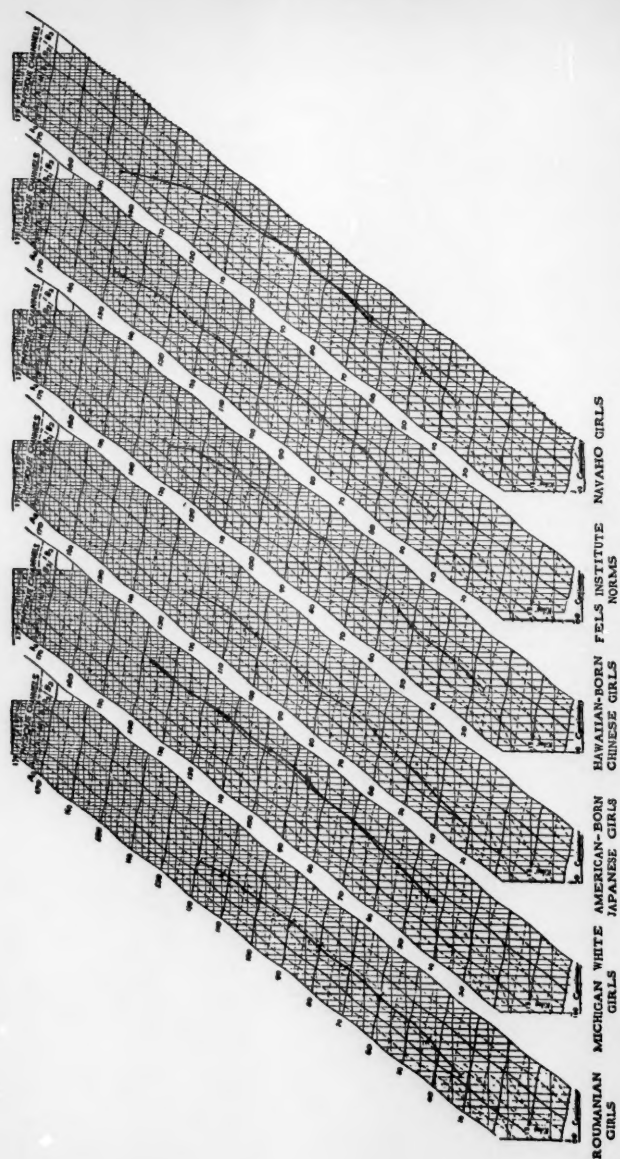


FIGURE 2—Mean paths for six groups of girls, as taken from the literature and plotted on the "Grid."

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channel position, 16 held position, and only 5 gained position. But in the older group, the pattern was reversed. Only 3 out of 31 lost channel position, 11 held position, and 17 (over 50 per cent) gained position. The difference between the two groups is statistically significant (by the Chi-square test), and there is little doubt that there is a prevailing tendency in the younger group to lose channel position, and a converse tendency in the older group to gain channel position.

Under these circumstances, which repeat the findings in the long-term study, two generalizations may be made. Firstly, in-channel straight-line progression is not the characteristic pattern in the group studied, and secondly, there is a definite tendency for younger girls to lose channel position, and for older girls to gain channel position. In the long-term study, these changes might have been attributed to gradual socio-economic trends. But in the present case, it would be difficult to find any economic explanation that could account for the simultaneous down-channel drift of younger girls and up-channel drift of older girls. Rather it would appear to be a characteristic of female growth and development not compensated for in the grid construction.

### FINDINGS ON MEAN DATA FROM THE LITERATURE

The two small series investigated both failed to confirm the universality of straight-line grid progression, but rather demonstrated a perverse tendency to follow an arcuate or trough-shaped path of their own. The question naturally arose as to whether this represented a unique, localized Bostonian phenomenon, or whether it was also true in the outside world. Accordingly, mean data on six series of girls selected at random from the literature were plotted on the grid. The six series included two from Steggerda and Densen (11), the Fels Institute norms (10), and three selected from Krogman's compendium (5) to provide diversity—a Chinese, a Japanese, and a Roumanian series.

As shown in Figure 2, the grid plots for all six series, duplicated to varying degrees the pattern exhibited by the two groups of Boston girls. Despite racial, geographical and socio-economic differences, all six series agreed in their tendency to lose channel position after age 6, and to gain channel position in the later years. The Navaho girls, measured by Steggerda and Densen (11) demonstrated this pattern to an extreme. The Roumanian and Michigan girls showed this trend in a less marked way. But the combined Fels norms, the Americanized Japanese and Chinese, the Navaho girls, and the Dutch-American girls from Holland, Michigan, all traced a trough-shaped path on the grid.

Admittedly, massed-data norms made up of mean values resemble individual growth patterns only to a limited degree, and undoubtedly the modal pattern in each case could have differed from the pattern traced by the combined height-weight means. Nevertheless, the similarity between these

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curves and the mean pattern for the Boston girls helps to minimize the possibility that the arcuate grid paths of the Boston girls are purely localized phenomena. They seem to grow like girls elsewhere.

### DISCUSSION

These findings serve to show that Boston white girls, from the lower and middle income groups, do not necessarily progress along a "straightline channelwise path" during the school years. Rather than channelwise progression being the rule, it was the exception, even over a short time period. As plotted on the Grid, the individual paths showed a marked tendency to deviate, a tendency apparent on a long-term basis and on a short-term basis as well. Moreover, the deviations were not entirely at random, but were systematically structured in relation to age. Younger girls tended to lose channel position, and conversely older girls tended to gain channel position. These tendencies, demonstrated on both a longitudinal series and a semi-longitudinal series, were also observed on the mean data for several groups selected at random from the literature. The findings indicate that deviations from straightline channelwise growth are rather common, and while the concept of channelwise growth is not necessarily erroneous, the channels that do exist in girls appear to be curved rather than straight as plotted on the grid.

In the longitudinal series, where the girls were followed from age 6 on, deviations from the starting channel were common. After one year only 50 per cent of the girls were still in-channel; after two years only 19 per cent were still in the starting channel. And, including those who had departed from the starting channel and subsequently returned, at no time thereafter were more than 30 per cent of the girls in the starting channel. On a group basis, as well as on an individual basis, there was a clearly demonstrated tendency to move downward, until about the twelfth year, and then to reverse direction. The modal pattern was arcuate (trough-shaped).

In the semi-longitudinal series, data on a larger number of girls confirmed the previous findings. As a group, less than 50 per cent were still in the starting channel at the end of one year, and nearly 10 per cent had shifted more than one channel. Among 34 younger girls, 38 per cent lost channel position, and only 15 per cent gained channel position. However, only 10 per cent of the older girls lost channel position, and 50 per cent gained. The pattern revealed in the longitudinal series over the course of ten years was duplicated in the semi-longitudinal series within one year.

Moreover, the mean data for Navaho, Roumanian, Hawaiian-born Chinese, American-born Japanese, Michigan, and Ohio girls, when plotted on the Wetzel Grid, followed a similar trough-shaped curve. This curve was most exaggerated for the Navaho girls, but it was apparent for all six groups.

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Naturally, these findings merit discussion and explanation. In particular there is the question of sampling, the possibility that one or both groups investigated (drawn from the Boston area) represent unique and aberrant populations, and the alternate possibility that external factors may have distorted the intrinsic growth pattern to produce the results obtained here.

The longitudinal series was followed over a period of 10 years. The girls were born during the depression, the height-weight record reported in this paper was begun just before our entry into the war, and completed (for the purposes considered) by 1950-51. In point of time, the loss of channel position began during the war and terminated at its end. The period of gain continued from 1946-1950. Without further thought, this curve could perhaps be used to "document" the effects of the war on the growth and development of Boston girls.

However, when we turn to the semi-longitudinal series, using data collected from 1949-1951, we find the same arcuate pattern of channel-loss in younger girls and channel-gain in older girls. Whatever economic changes may have affected child growth during this recent period, it is difficult to conceive of any that could have totally opposite effects on different age groups. And the data reported in the literature, which was collected at various periods during the last 30 years, would tend to erase short-term economic effects; yet the prevailing pattern is consistent.

The comparative agreement, among the longitudinal, the semi-longitudinal, and the literature series, also helps to eliminate unique localized growth aberrations. Moreover, the question of health status (assuming that some sub-clinical defects were overlooked by the pediatricians) can be eliminated from consideration here, since the different series, examined at different times and under different conditions, repeated the same pattern.

There are two problems to consider then, firstly, the problem of deviation from channel position and, secondly, the problem of the arcuate trough-shaped path. It is evident that deviations, equalling or exceeding the tolerance limits of  $\frac{1}{2}$  channel per 10 developmental units, occur in most normal girls. Assuming a "point-a-month" progression, the majority of the girls in both series exceeded these tolerance limits and in some cases even the mean deviations (combining both positive and negative deviations) exceeded these values, given by Wetzel as the limits of normal variation.

But the arcuate trough-shaped path observed in the longitudinal series, in the short-term series, and in the mean data taken from the literature deserves special consideration. At first it is characterized by a down-channel shift, a movement in the direction of the B channels. This shift toward greater linearity coincides in time with the "stretching-out period" of growth, when long-bone growth is unaccompanied by a proportionate increase in subcutaneous fat. On the other hand, this early trend is reversed in the later years, during the "filling-out period" of increased musculature and (especially in girls) marked increase in fatty deposits. It would appear,

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then, that the grid as now constructed does not adequately correct for changes in female body build during prepuberal and steroid-mediated development.<sup>4</sup>

It is not the purpose of this paper to deny the utility of the grid as a descriptive tool in clinical studies, nor to argue against the existence of individual predetermined optimal growth paths. But it is the purpose of this paper to point out that in the groups considered deviations from "channelwise" growth were common, that the tolerance limits of  $\frac{1}{2}$  channel per 10 developmental units were commonly exceeded, and that individual growth paths as well as the modal paths tended to follow an arcuate trough-shaped curve rather than a straight line.

Considering interpersonal differences in growth rate, localized growth gradients and variations in the onset of ovarian and adrenal function, it is understandably difficult to construct a simple scheme that will more than approximate the growth patterns of an individual even if a number of points on the curve are available at the start. And this difficulty seems to be reflected in the present study of individual and group deviations from channelwise progression.

### SUMMARY

1. Constancy and variation in "channelwise grid progression" was investigated on two series of Boston white girls.
2. In the longitudinal series, the proportion of girls still in the "starting" channel dropped to 50 per cent after one year, 19 per cent after two years, and at no time thereafter exceeded 33 per cent.
3. In the short-term series, over 50 per cent of the girls deviated one or more channels in a one-year period, and 9 per cent deviated two or more channels.
4. In both series there was a down-channel trend during the earlier years, and a converse up-channel trend during the later years.
5. The same two trends were observed when mean data from six series taken from the literature were plotted on the Wetzel Grid.
6. It was concluded that constancy of channel position is not a usual phenomenon in girls. Deviations exceeding the "tolerance limits" given by Wetzel are common, and the Grid does not entirely correct for changes in female body build during growth and maturation.

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<sup>4</sup> This is also true in conventional growth charts where variations in the onset of the steroid growth phase cause spurious "deviations" in percentile status.



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## A STUDY OF PERSONALITY AND SOCIAL STATUS

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Can we depend on social status to determine the criterion on which we may base our objectives of adequate and desirable personal characteristics? In the past there has been considerable emphasis on adults' or teachers' evaluation, that is, the child's status with adults. Sometimes a teacher's comment, "He is well-liked by other children," suffices to cause us to overlook the necessity of further study. We have discovered that a child might have status with the adult, or parent, parent surrogate, or teacher and still not be making a satisfactory adjustment.

We have found that adults tend to judge children's adjustment and wholesomeness of social status by adult standards and not always according to the child's needs (9, p.1). Can we, then, rely on children's judgment in evaluating social status as our criterion for basing our objectives in working with children? That is, are children's choices a valid basis for determining a child's developmental goals? Is it correct to assume that if a child is chosen often by children for their activities that such a child is meeting effectively the problems of his development?

We are in a better position to describe those aspects of an individual's make-up which interfere with interaction with the environment than we are in describing our goals or desirable characteristics. This position, it seems, can be accounted for by the fact that adjustment to some degree involves adequate relationships to cultural demands. There is no general agreement by clinicians, parents, educators, social workers, or religious workers on optimum personal adjustment. Some would have us encourage certain characteristics of personality such as striving and competitiveness, while others would have us seek to avoid the development of such behavior. Some would encourage a child to express his hostility and other emotions, while others would not tolerate hostility and would allow few expressions of emotionality. Thus, it can be seen that at the moment we cannot generally agree on just what the optimum behavioral characteristics of a child should be. On the other hand, we can probably reach a closer agreement on those characteristics which interfere with the effective solution to prob-

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lems of living and those which interfere with satisfying interpersonal relationships (8, p. 20; 10).

Thus, what we are trying to do is to examine a child's perception of himself and his world and his approaches to solving problems encountered in interaction with the environment. We wish to determine if he would be able to engage in effective goal-seeking behavior toward any objectives which might be set by him or society. For example, this position is similar to that taken by a clinician in a therapeutic situation where it is said that the therapist must work with the client to help him achieve a reality of perceptions and a freedom from interference with effective reasoning processes. What the client actually decides to do about his particular problem is left with the client. It seems logical as we further explore and study the cause and effect of interferences with effective goal-seeking behavior that we will be better able to approach evaluative criteria of personal adjustment and be able to set up well-defined goals (1).

Apparently the problem of describing optimal personal adjustment must be approached through the initial steps of stating what we must avoid. The purpose of this report is to make known some findings in regard to behavior characteristics of a child most chosen for an activity by the members of his group. The question which we seek to answer is: Does the fact that Joe was chosen to participate in each child's activity by more children than any other member in his group mean that he is capable of solving his problems of living effectively? We shall not try to describe the characteristics which Joe should have for personal adjustment; we shall only seek to determine whether or not he is able to work toward his goals effectively and solve his problems of living.<sup>1</sup>

### METHODOLOGY

The subjects for this study were twenty-seven children in the fourth grade. There was an age range of nine years to ten years and three months and a mean age of nine years and one month. The group consisted of sixteen girls and eleven boys.

<sup>1</sup> This is a report on research carried on under a grant from the Florida State University Research Council and Department of Psychology. It was a cooperative project under the direction of Theron Alexander. Those contributing to the research were Eugene Boyce, principal of the Demonstration School; Mary Bostwick, teacher of the fourth grade; Samuel Granick, formerly a member of the department of psychology and Human Relations Institute; Mary V. Alexander, department of physical education; Julia Schwartz, department of art education; Charlotte Larkin, art supervisor for Leon County; Theodore Johannis, student and research assistant in the department of home and family life; Mary Johannis, director of the nursery school; Eugene Byrd, Jane Srygley, Tom Long, Richard Berndt, Kathryn Aspinwall, Barbara Buechly, Curt Vogtritter, Zenia Davis, Wallace Kennedy, students in the department of psychology; and Alvina Birchard, student in the school of education. Professor M. F. Nimkoff made valuable suggestions in preparation of the manuscript.

## Theron Alexander and Marie Alexander

The social status of the children was determined by a series of three sociometric tests.<sup>2</sup> The first test was a "paper and pencil" test consisting of one question. As a preliminary to the study a research worker discussed with the children the plans for their activities.<sup>3</sup> "Putting on plays" was the chosen activity. After the discussions the examiner gave the test question by asking each child to write down his choice of persons to be in his own play. The children were allowed to write as many choices as they wished. Four days later dramas were presented before the whole group at the rate of two per one-hour session. Two one-hour sessions were held each week. The subjects indicated their choices to the examiner, then read the names, and then each child and the cast he chose went to one side of the room. Roles were assigned by the "director" (the chooser) and his plans for the play were discussed. The play was then given before the group. A week after completion of the series of dramas, the group was given the opportunity to make choices again for a play and wrote the names of the ones they wanted for their play.

The rank order of the subjects was determined from the above testing situations. Joe was found to be the most chosen child in all of the situations.

### A Study of Joe's Characteristics

*Procedure.* The main source for the data discussed in this report is the Thematic Apperception Test.<sup>4</sup> The following cards from the TAT were used: 1, 3BM, 7GF, 8BM, 12BG, and 13B (6). Joe's stories about these pictures follow:

1. The boy in the picture I think broke instrument. I think he is going to take it to a store and fix it. And then he will be able to play again.

3BM. The girl in the picture is crying like she had lost her little boy. The end. (The examiner: Is there any more?) The little boy was in the woods and had hurt his leg. His mother started to pick some flowers and she saw him and picked him up and carried him home.

7GF. The girl in the picture looks like she had broken her doll and then her mother started to read to her a sad story about a little doll. In

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<sup>2</sup> In reality social status cannot be determined by children's choices in regard to one activity. Helen Jennings and others have shown that children's choices vary as activities vary. We felt, however, that choice for participation in play activities was a valuable sample of a child's positive feelings toward other members of a group. In a description of social status, perhaps we are confronted with as complex a term as we are with "personality." Apparently our value systems are present in the term "social status." For this study we only know that Joe was most chosen consistently in three situations.

<sup>3</sup> Eugene Byrd, a graduate student in the department of psychology, gave the test. He has written a report entitled, "A Study of Validity of Constancy of Choices in a Sociometric Test," which has been accepted for publication in *Sociometry*.

<sup>4</sup> Other tests and techniques for obtaining data were Rorschach, Stanford-Binet, imaginary autobiography, observations, and family interview, puppet play, and others. Certain children were given psychotherapeutic experiences.

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the story her mother told her that the doll in the story had got broken like her's and her daddy fixed it as soon as he could.

8BM. In the picture it looks like a little boy and a little girl was playing with a gun and he accidentally pulled the trigger and it shot off and hit the little girl in the arm and he did not know it was loaded and the doctor came as soon as he could. And fixed her arm.

12BG. In the picture I see now a boat is on the shore and it looks like two or three men had left it there and went hunting.

13B. The little boy in the picture looks like he had broken one of his toys and he is very sorry and he wanted it fixed. The little car had been broken his daddy fixed after he came back from chopping wood.

An outline of the method of analysis of the projective data follows:

### Organization of Response:

1. Use of stimuli (those presented and those added by subject).
2. Parts of the story included; conditions, causation, and outcome.

### Emotional Behavior:

1. Expressions of emotion (kinds of feeling).
2. Acceptance of emotional behavior:
  - a. feeling between people.
  - b. feeling about own emotionality.

### Predominant Conflict Area:

1. Conflict type (external or internal).
2. Solution efforts (submitting or waiting, seeking help, or active attack).
3. Self-concept in problem solving (unsuccessful, indecisive, and successful).

*Joe's view of his world and himself.* Joe views his world as being composed of both hostile and beneficent forces. These forces are little influenced by him. The hostile forces are viewed as impersonal—they just happen. However, he believes that somehow they are related to him. He makes little effort to understand causation of the events or situations in which he finds himself. The causes to him are really unaccountable. With some consistency he sees that solution for problems also lies from without. Chronological aspects of such aid are beyond his influence. There is anxiety about these outside forces which put him in situations from which he is unable to extricate himself.

He sees himself as a person unable to cope successfully with powerful forces. He finds himself in difficulty and although he is not able to determine the cause of the difficulty he holds himself as connected with the cause. It is as if he says, "These impersonal forces got me into this situation and once I am here I am to blame." This has brought him to a non-logical effort toward conformity.

He depends on the same forces which have involved him in difficulty to extricate him. This inability to cope with his world has had two effects on Joe. One, he is afraid to recognize or express any feelings of aggression and hostility toward the outside world. Therefore, hostility has been turned inward. With this feeling of inability to cope with his world and the repression of hostility, there has developed a pervasive feeling of guilt (4, pp. 87-88). Thus, the second effect is a masochistic preoccupation—things are broken. This preoccupation serves several ends. First, if things are broken and he was not responsible, an indirect outlet for aggression is provided. Second, a feeling of need for punishment for his inadequacy is served by the fact that things are broken. And third, a need for nurturance is fulfilled by the fact that external forces will in their own good time remove the punishment and difficulty (2, p. 82).

*Joe and interpersonal relationships.* In Joe's interpersonal relationships there are no expressions of hostility or animosity. He is docile and conforms to directions. He is seldom original or creative but depends on others for ideas and falls into line with them. Whatever play ideas are proposed and suggested for him he will carry out. He is happiest when he is acting under control and directions of others, because responsibility for his own actions and the possibility of the increase of guilt are then lessened. Although there is docility and little hostility, this does not mean there is warmth, sympathy, or affection. As can be seen from the description of his views of his world and himself, he does not see in it satisfying relationships. Any positive action on the part of others or external forces comes only in association with trouble and pain; succorance which he receives is viewed as being aimed at the difficulty and not himself. That is, it is not his own value that brings the beneficent forces which solve the problem but it is the problem itself. Such an experience involves no affection and he does not experience such feelings in his interpersonal relationships.

Joe's high number of choices is based on his docility, conformity, and willingness to implement the ideas and projects of others. It is believed that all human beings have needs to dominate and to be aggressive (5, p.1). These are expressed in many different ways. Joe's relationship with his peers is symbiotic in that he has acquired the need to be directed and even punished, and at the same time he provides an outlet for the aggression of others in that it satisfies him and the aggressor. While this may be a workable relationship, the undesirableness lies in the fact that for the maximum development of each individual there should be an interchange of need fulfillment. That is, Joe should have his need for aggression expressed on the outside and not have the aggressive feelings of others and his own turned toward himself. In other words, this is an unbalanced exchange—a one way path for these forces which is undesirable both for the aggressor and the recipient of the aggression. And of course, there should be in human relationships warmth, sympathy, and affection and here these are lacking.

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Although Joe's social status is high, he is a child who in his interpersonal relationships remains emotionally isolated. It is as Helen Jennings believes, social status is related to the interpersonal contributions of members of a group, and Joe's contribution is one in which he is acted upon by the group (3, p. 205).

*Joe's needs.* We believe that, although Joe is most chosen by the members of his group, he still is in need of aid toward certain adjustmental processes. Richards states the problem well: "The patient needs aggressive expression through some outlet that will provide release and yet will not be disastrous to others and so increase his frustration" (7, p. 257). Joe is on a course in development which will lead to further difficulty. He will be increasingly at a loss because of his emotional isolation. This is likely to increase his feeling of guilt, anxiety, and the aggressive tendencies toward himself. It is likely that psychosomatic manifestations will develop.<sup>5</sup> Joe's difficulties at present tend toward a basis for fundamental problems. Richards points out this basis: "Fundamental to conflict in most instances of neurosis or psychosis is frustration in the search for love and recognition, aggression because of frustration, and the need for expression of this consequent hostility" (7, p. 257).

### CONCLUSIONS AND QUESTIONS

This study has provided evidence that children's choices may not be a criterion of value on which to base adjustmental goals. It is not indicated that simply because a child is most chosen by his peers that he is effectively meeting his developmental tasks or possesses desirable personal characteristics. It is further indicated that his very popularity may be an indication of difficulty. In Joe's case he was not chosen because of desirable characteristics but as an outlet for aggression and directive needs of other children. Too, Joe cannot be considered a leader. It seems we should be careful not to confuse high social status and leadership. Joe's personal characteristics do not contain those usually included with those of leadership.

This study leads us to certain fundamental questions. Some of these follow: How often in children's groups are most chosen children ineffective

<sup>5</sup> The interview with the mother corroborated this development. She reported enuresis and that Joe had recently begun nail-biting. The origin of Joe's difficulties is not within the scope of this study. However, Joe's family conditions certainly have some bearing on his difficulties. A research worker, Mrs. Mary Johannis, reported that Joe lives in a rather small house near a noisy street. The house gives the impression of being too full of furniture and people. The house is owned by Joe's grandmother. He, his mother, and four-year-old brother moved there when his father was recalled to active military service. The household was already crowded. It consisted of the grandmother, two uncles, thirteen and twenty-one years old, and a sixteen-year-old aunt. Difficulties would soon be added to the situation since Joe's mother was expecting her third child. In talking about the living conditions, Joe's mother said, "It's crowded here. It would be better to be off by ourselves. Our children are mixed in and it's not so good."

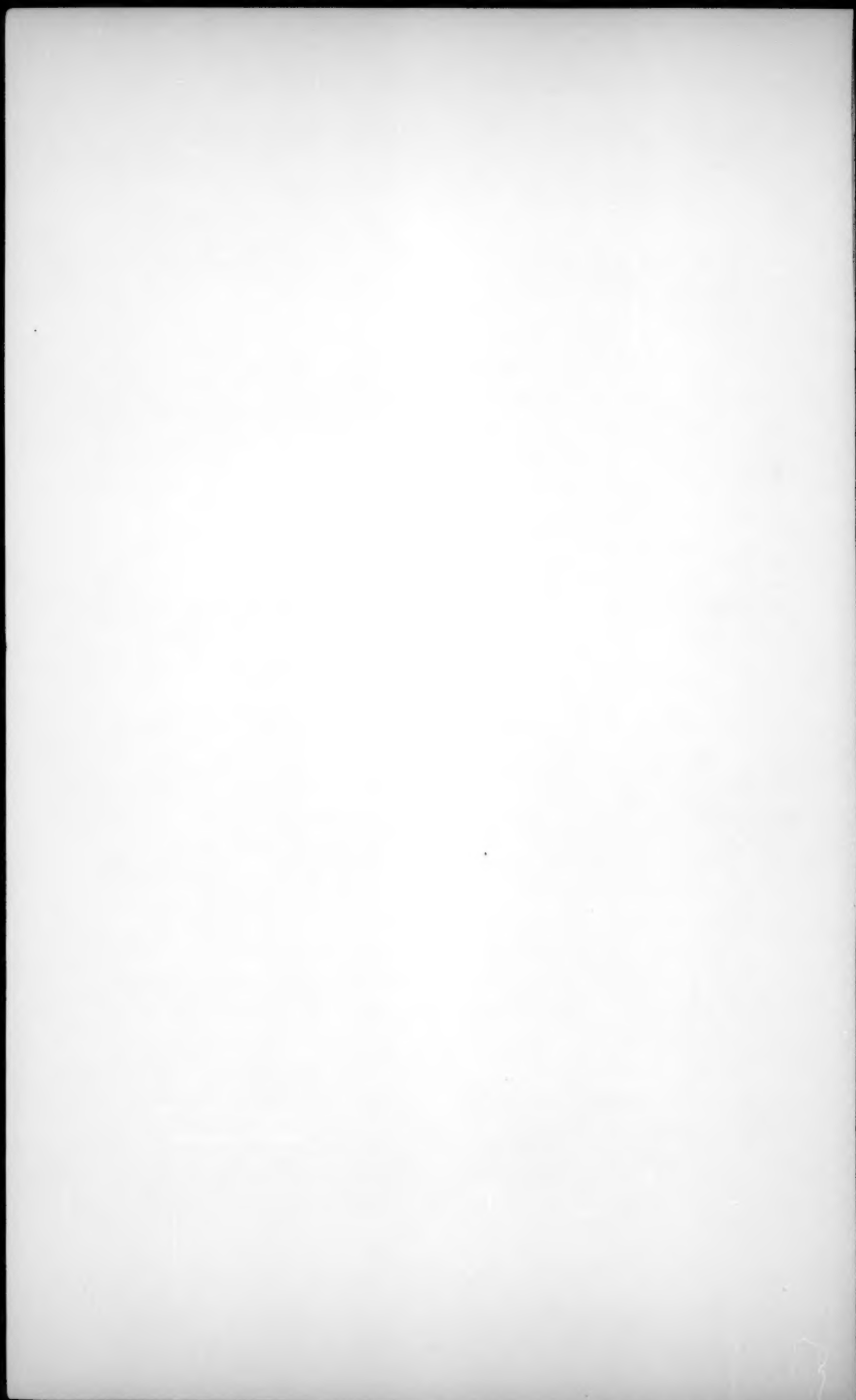


and in need of aid toward more satisfying interpersonal relationships? Or, do extremes of high social status in children's groups usually mean difficulty? Does the fact that a child is most chosen mean that he has certain fundamental characteristics that will lead to neurosis? That is, does the fact that a child must fit in with the various patterns of personality of each member in a group mean that his totality of personality can only appeal to certain basic needs such as that of an outlet for aggression?

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# THE FREQUENCY OF PHYSICAL DISABILITY IN CHILDREN: A COMPARISON OF THREE SOURCES OF INFORMATION

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## INTRODUCTION

The investigation here reported had two aims: (a) to compare the adequacy of laymen, teachers, and physicians as sources of information regarding the frequency of physical disability in children, and (b) to make a census of physically disabled children of Jefferson County, Kansas. When the survey was undertaken, the State of Kansas was considering a new educational program for certain classes of exceptional children, and educational policy-makers were handicapped by lack of data on the extent of the problem. One purpose of the study was, therefore, to provide data for one county. More fundamentally, however, the investigation sought to contribute to a solution of the difficult problem of determining the incidence of physical disability in children.

Jefferson County, Kansas, is a rural county with a population of 11,084 in April, 1950 (9, chap. 16). The assessor's rolls indicate that 64 per cent of the citizens were at this time residents of farms and that the remainder lived in the eight small towns of the county which ranged in population from 1,141 to 349. The United States Bureau of the Census provided the following data on the children of the county in April, 1950 (10):

	<i>Male</i>	<i>Female</i>	<i>Total</i>
Under 5 years .....	530	500	1030
5-14 years .....	991	901	1892
15-20 years .....	452	432	884
Total under 21 .....	1973	1833	3806

## METHODOLOGICAL PROBLEMS

Studies of the incidence of physical disability in the United States differ greatly in their findings (1, 2, 3, 5, 6, 7, 8). This is clearly an unsatisfactory state of affairs. Support of ameliorative programs can hardly be secured

<sup>1</sup> This survey was made by the Midwest Social Psychology Research Station, of the University of Kansas, with the support of the Association for the Aid of Crippled Children and the Carnegie Corporation of New York. The valuable aid of Miss Jean Clark and Mrs. Mary Weinberg of the Jefferson County Welfare Department is gratefully acknowledged.

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on the basis of widely conflicting claims regarding the size of the disability problem. The effectiveness of a number of medical, educational, vocational, and social services can only be judged if the number of disabled persons can be reliably determined. Important scientific problems cannot be studied in the absence of dependable methods of assessing the frequency of physical disability.

There are a number of reasons for discrepancies in the data regarding number of physically disabled persons. The chief appear to be: (a) the use of different *definitions and criteria of physical disability*; (b) the use of different *samples of the population*; (c) the use of different *methods of enumerating the disabled*. Some problems connected with these sources of discrepant results will be discussed, and the procedures used in the present investigation will be indicated.

The definitions of physical disability used in different studies have varied widely. Here are some that have come to our attention. Physically disabled persons are those who

- (1) deviate from what is considered normal . . . to the degree that they require adjustments in educational provisions (2).
- (2) are diagnosed by a physician as having a "clinical entity" (3).
- (3) [are] unable to do their work or perform other duties because of disease or injury . . . [or] . . . have a long-term physical . . . condition that allows them to work only occasionally or not at all (5).
- (4) suffer from any physical disability making it impractical or impossible for them to benefit from or participate in the normal classroom ✓ program of the public schools . . . (1).
- (5) because of physical deformities or prolonged disease cannot attend school (6).
- (6) [are] so handicapped through congenital or acquired defects in the use of . . . limbs or body musculature, as to be unable to compete on terms of equality with a normal individual of the same age (8).
- (7) aren't able to do their regular work or other duties . . . because of illness or disability (7).

With such a variety of definitions of physical disability, it is understandable that the results of surveys vary widely. There is great need for a standard definition and for standard criteria of physical disability. In this connection, the state of affairs with respect to intellectual disability is of interest. Although the problems of measuring intellectual disability are in some ways more difficult than those of measuring physical disability, standardized techniques of measuring the former are well developed. Consequently it is possible to state with confidence the number of persons in a population who fall within defined intellectual ability ranges. A beginning has been made in the development of standard measures of physical disability by Deaver in the case of severe orthopedic injuries (4). However, much more must be done. Until the measurement of degree of physical dis-

ability is advanced at least as far as the measurements of mental disability, many scientific and practical problems will remain in a state of confusion.

We have used a single indicator of physical disability in the present study. It may be stated as follows: A physically disabled person is one who is *generally perceived* in his cultural group to have a physique that prevents him from participating in *important* activities on terms of *equality* with normal individuals of his own age.

This definition of physical disability has a number of points to recommend it:

(1) A person who is generally seen by his associates as disabled is, *ipso facto*, socially handicapped; this is a social fact of importance.

(2) There is undoubtedly a fair degree of agreement between general perception of physical disability and its objective, professional evaluation in American culture. This relationship deserves detailed study. It seems clear, however, that in cases where there is disagreement, general perception will be as important as professional judgment in some contexts. For example, some characteristics of speech that are seen as defects by experts are not so seen by laymen. Such "defects" cannot, therefore, be considered handicapping in ordinary life situations. The reverse is also true: some physical characteristics that are not medically disabling may be generally seen as disabilities none-the-less. This is true, for example, of short stature in males.

(3) Identification of physically disabled persons in accordance with this definition is relatively easy. It requires no costly diagnostic procedures.

A limitation of the definition lies in its exclusion of disabilities that are not socially visible. A heart defect that is known only to the disabled person and his physician will be missed when this criterion is used. This is true, also, of physical defects that have not been diagnosed. However, the physical disabilities that are not enumerated for these reasons will usually be incipient and minor ones.

Surveys of the extent of physical disability have dealt with quite different samples of the population. The fact that physical examinations are not compulsory and that citizens cannot be made to reveal information about their health means that unbiased samples of the total population are very rare. The purposes of most surveys have limited them to such particular population groups as males of military draft age, applicants for insurance, and children. Obviously, the incidence of physical disability will vary with the population group surveyed. The purpose of the present investigation, which has already been stated, limited it to the children of one particular region.

Methods of enumerating physically disabled persons in population samples are closely related to the criteria of physical disability that are used. If ability to attend regular public schools is the criterion adopted, school enrollment records and census rolls may be used to indicate the number of disabled school-age children; if suitability for military service is the criterion,

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data on rejection rates can be used. Such official records are unavailable for most population groups, so it is important to evaluate the adequacy of various direct survey procedures. Hence, one objective of the present study was to compare the completeness of the information secured from three sources, namely, laymen, teachers, and physicians. Only information was obtained that was in the possession of an informant at the time of the survey; no special inquiries were made by informants for the purposes of the survey.

### METHOD OF SURVEYING LAY INFORMANTS

In order to acquaint people of the county with the purposes, plans, and personnel of the study, the following article was carried in each of the six weekly papers published in the county and a talk along similar lines was given to a county-wide meeting of school board members.

### JEFFERSON COUNTY SELECTED FOR SURVEY OF HANDICAPPED CHILDREN

#### STATEMENT BY THE COOPERATORS IN A FORTHCOMING PROJECT

In the last few years the people of Kansas have been increasingly concerned with the problem of the best care and education of handicapped children. The Kansas Council for Children and the Division of Special Education of the State Department of Education are among the organizations which have been greatly interested in this problem.

One difficulty is that no one knows just how many such children there are in any one county or in the state. Without this information it is not possible to make the best use of existing facilities or to devise adequate and sensible legislation. If a careful and thorough census can be made in one county, the results can be applied in a general way to other similar counties. It is clear, however, that the county in which the survey is made will have a real advantage when it comes to providing special education and care. Such a survey will be conducted in Jefferson county by Miss Jean Clark, Mrs. Mary Weinberg, Mr. and Mrs. Phil Schoggen and Mrs. Roger Barker.

Miss Clark's interest in the survey stems from her position on the Executive Committee of the Kansas Council for Children. Mr. and Mrs. Schoggen and Mrs. Barker will work on the survey as a part of a new research project which is concerned with physically handicapped children under the direction of Drs. Roger G. Barker and Herbert F. Wright of the University of Kansas. This research is supported by a grant from the Association for the Aid of Crippled Children and The Carnegie Foundation.

Work on the survey will begin during the next few weeks. Because of the small staff available, the survey can succeed only by having the cooperation of citizens throughout the county.

The survey will include every individual under 21 years of age who is so handicapped in any way as to be unable to compete on terms of equality with normal individuals of the same age.

There are three primary reasons for the interested cooperation of the people of Jefferson county:

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1. The survey should help to bring better education and care to handicapped children of Jefferson county.
2. The survey should benefit the handicapped children of Kansas by providing a better basis for planning for them.
3. Through follow-up and continued research, perhaps a better understanding of all handicapped children will result.

The main approach to the laymen of the county was via the Home Demonstration Units. These Units are women's clubs which follow the educational program outlined by the Extension Service of the State Agricultural College. In addition to a study program, each Unit is expected to give service to the community. The cooperation of the County Advisory Committee of the Extension Service was sought and the project explained to this committee in detail. This was done by a staff member of the survey group who was also a member of the County Advisory Committee. This Committee adopted a resolution recommending that the Home Demonstration Units cooperate as a part of their community service program. Interviewers then got in touch with the president of each Unit to arrange a time for visiting a regular meeting.

Each of the 27 Home Demonstration Units was visited. The total membership of these Units was 503 and the number of members present on the days the Units were visited was approximately 425. The location of the Units was well distributed throughout the county. The members of 17 of these Units were almost entirely rural women, the membership of 7 Units was divided between rural and town women, and the members of 3 Units were predominantly town residents. A staff member explained the survey to the group and informally obtained the information desired through group discussion with the members present and through conversations with individuals during the social hour. Great care was taken to explain the purpose of the survey and to guide subsequent discussion. The following policies were adopted:

(1) The sponsorship of the survey was made explicit, namely, The Kansas Council for Children, The County Welfare Department, and the Child Study Project of the University of Kansas. These were all trusted institutions with considerable prestige.

(2) The purpose of the survey was clearly stated. It was pointed out that adequate educational and medical services for handicapped children could be secured only if the extent of the problem of disability were known. No hope of immediate advantages to Jefferson County was held out, although it was mentioned that County and State authorities would be free to use the information secured in any way they might wish.

(3) The spontaneity of the group was allowed to guide the group discussion. Considerable variation was found in the amount of information provided during the group discussion. An important factor here was the attitude of any group member who was related to a handicapped child. If

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such a person spoke freely and spontaneously about the child, others apparently felt free to report other children. Otherwise, information tended to be given privately to the interviewer after the group activities were over.

(4) With both individual informants and groups it was found necessary to specify separate disability categories, and to ask informants to mention children in each category. At one Unit meeting, the interviewer arrived a few minutes late and was told by the president that they had been talking over the survey and were pleased to report that their community had no handicapped children. When the common kinds of handicapping conditions were mentioned, the group was surprised to find that ten children with disabilities lived in the district.

A child was included in the list of physically disabled children if he was mentioned by one or more members of a Home Demonstration Unit.

### METHOD OF SURVEYING TEACHER INFORMANTS

The interest and permission of the County Superintendent of Schools was secured and, as stated above, the plan of the survey was reported to a county-wide meeting of school board members. Following this introduction, a staff member visited every rural, town, and parochial school of the County. The number of schools visited was as follows:

Rural schools .....	29
Town schools—elementary .....	13
Town schools—high school .....	8
Parochial schools .....	2

In schools with more than one teacher, an effort was made to see every teacher either individually or in a group. In a few schools this was impossible because of scheduling difficulties. In these cases the information the school principal was able to give for the class in question was used. Actually, 133 or 90 per cent of the classroom teachers of the County were interviewed.

In general the same procedures were followed in talking with the teachers as were used with the Home Demonstration Units. However, in some rural schools the teacher asked the children for additional information or called an individual handicapped child to the interviewer's attention.

A child was listed as disabled if he was mentioned by one or more teachers.

### METHOD OF SURVEYING PHYSICIAN INFORMANTS

The six physicians whose practice centered in the county were interviewed by two members of the County Welfare Department. The cooperation of members of this department was most helpful, not only in obtaining this information but also in lending support to the whole survey. Further professional medical information was secured through the roster of the Crip-



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pled Children's Commission. Children who obtain needed medical care under the Crippled Children's Commission must register with the Probate Judge. These records were graciously made available to the survey.

### STANDARD LIST OF HANDICAPPING CONDITIONS USED IN INTERVIEWS

A standard list of kinds of disabling conditions was used in all interviews. Although it was stressed in general that we were interested in anyone with a physical condition which prevented him from participating in important activities on terms of equality with normal individuals of his age, it was found advantageous to make explicit some of the kinds of disability the first informants had mentioned and the criteria of disability they had used. In the later stages of the survey, therefore, the following disabilities and definitions were used.

*Visual handicap.* Visually handicapped children were found to include those who were blind in one or both eyes or whose visual defects were uncorrectable or only partially correctable by glasses.

*Hearing handicap.* Noticeably hard of hearing and deaf children were included here. Hearing aids were commonly seen as impeding a child; therefore, any child who wore a hearing aid was included.

*Speech handicap.* Children with defects which interfered with being understood were reported here. Minor defects and infantile speech in young children were excluded as not handicapping.

*Orthopedic handicap.* Any child with a crippling condition whether caused by disease, injury, or congenital factors was listed.

*Heart defect.* Any child whose activity was restricted because of heart condition was included.

*Central nervous system disorder.* Here were mentioned those with cerebral palsy, epilepsy, and a history of spinal or cerebral meningitis, brain tumor, or brain injury.

*Extreme variation in physique.* The exceptionally tall, short, fat, and thin were mentioned here.

*Diabetes.* Children with diabetic conditions requiring special diets or medication were included.

*Other disabilities.* Other handicapping conditions which did not fall under the foregoing headings were sought. Those mentioned included general ill health, asthma, undulant fever, tuberculosis, severe disfigurement, and severe denture problems.

### RESULTS

The number of physically disabled children living in Jefferson County, Kansas, as reported by the 425 laymen, 133 teachers and six physicians surveyed in the Spring of 1951 are given in Tables 1-5. They indicate the incidence of physical characteristics that are generally perceived in this locality as physically disabling to children. To be included in these figures,

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TABLE 1  
INCIDENCE OF PHYSICALLY DISABLED CHILDREN  
IN JEFFERSON COUNTY, KANSAS

	Number	<i>Per Cent of All Children in Each Classification</i>
Male .....	139	7.1
Female .....	87	4.8
Preschool (under 6 years)* ....	28	2.3
Grade school (6-13 years) ....	142	9.2
High school (14-17 years) ....	42	7.0
Post high school (18-20 years)	14	3.1
Total .....	226	5.9

\* The percentages reported for this and the following items are based upon estimates of the total population in each age category; the available census data were not divided into the same age groups as the school program.

a child must have been seen by one or more adults as deviating from normal in physique, and this deviation must have been judged to interfere with his participation in important activities.

*Number of physically disabled children.* In Table 1 the number and percentages of physically disabled children are presented. According to these data, 5.9 per cent of the children of the Jefferson County, Kansas, were seen by adults of the county as physically disabled in one way or another. This amounts to one child in seventeen. The rate of perceived disability was greater among boys than among girls and it was greater for school-age children than for preschool or for postschool children.

Data on school status are given in Table 2. In this county approximately 4 per cent of the physically disabled children who were of school age attended special schools; in all cases these were state residential schools outside the county. Six and one-half per cent of the physically disabled children did not attend any school; none of these home-bound children received

TABLE 2  
SCHOOL STATUS OF PHYSICALLY DISABLED CHILDREN

	Number	Per Cent
Number in regular schools .....	165	89.7
Number in special schools .....	7	3.8
Number not in any school .....	12	6.5
Total, school age .....	184	100.0

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any formal education.<sup>2</sup> Almost 90 per cent of the physically disabled children attended regular schools. It is impossible to say what special educational advantages these children received. However, many of the rural school classes were small, so that individualized instruction was undoubtedly provided for some children. There were no special teachers of exceptional children in the county.

TABLE 3  
NUMBER OF PHYSICALLY DISABLED CHILDREN REPORTED  
BY VARIOUS INFORMANTS

<i>Informants</i>	<i>Number</i>	<i>Per Cent of 226</i>
Laymen*	109	48.2
Teachers†	173	76.5
Physicians‡	40	17.7
Laymen and/or teachers§	209	92.5
Laymen and/or physicians	132	58.5
Teachers and/or physicians¶	196	86.6
Laymen only**	30	13.4
Teachers only**	94	41.5
Physicians only**	17	7.5

\* Includes all cases reported by laymen, including those reported only by laymen and those reported by laymen and teachers; laymen and physicians; and laymen, teachers, and physicians.

† Includes all cases reported by teachers, including those reported only by teachers, and those reported by teachers and laymen; teachers and physicians; and teachers, laymen, and physicians.

‡ Includes all cases reported by physicians, including those reported by physicians only, and those reported by physicians and teachers; physicians and laymen; and physicians, teachers, and laymen.

§ Includes all cases reported by informants named in note "\*" and note "†."

|| Includes all cases reported by informants named in note "§" and note "¶."

¶ Includes all cases reported by informants named in note "†" and note "§."

\*\* Includes those cases mentioned by the designated informant group and not mentioned by any other informant group.

*Sources of information.* In Table 3, data are presented regarding the adequacy of the different sources of information about the physically disabled children. According to these data, teachers provided the most information. If the survey had relied upon the teachers, 76.5 per cent of the total number of disabled children discovered would have been reported; without the teachers, 41.5 per cent of the cases would have been missed. Laymen provided less information than teachers; 48.2 per cent of the total

<sup>2</sup> A new educational provision for home-bound children was instituted in the state a few months before this survey was made. This may change the picture in the future.

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number of cases were reported by laymen; 13.4 per cent would have been omitted if laymen had not been surveyed. The least complete results were obtained from physicians; 17.7 per cent of the total number of cases were reported by physicians; 7.5 per cent of the cases would have been omitted if the physicians had not been interviewed.

Data upon the effectiveness of pairs of informant groups indicate that laymen and teachers reported 92.5 per cent of the total cases discovered, teachers and physicians reported 86.6 per cent of the cases, and laymen and physicians reported 58.5 per cent of the cases.

*Incidence of particular disabilities.* The 226 disabled children were reported to have 255 different disabilities; 14 boys and 10 girls were reported to have more than one disability. The data are given in Table 4.

TABLE 4  
INCIDENCE OF DISABILITY BY CATEGORIES

Disability	Number of Disabilities			Per Cent of Disabilities	Per Cent of Population
	Male	Female	Total		
Speech .....	39	22	61	24	1.6
Visual .....	22	20	42	16	1.1
Orthopedic .....	13	13	26	10	0.7
Central Nervous System ...	17	9	26	10	0.7
Heart .....	16	8	24	9	0.6
Auditory .....	15	8	23	9	0.6
Physique .....	10	8	18	7	0.5
Diabetes .....	4	1	5	2	0.1
Other .....	20	10	30	12	0.8
Total .....	156	99	255		

The disabilities are listed in this table in order of reported frequency of occurrence. Speech, visual, and orthopedic disabilities accounted for 50 per cent of the generally perceived physical disabilities among the children.

*Sources of information regarding particular disabilities.* In Table 5 data regarding the sources of information about particular disabilities are given. From these data it is clear that teachers were the best source of information for all categories of disability except the category "Other." However, teachers were not much better than laymen as a source of information about orthopedic and central nervous system disabilities. Teachers were most aware of speech, visual, and physique handicaps and least aware of "Other," orthopedic, and diabetic disabilities. Laymen, on the other hand, were most sensitive to auditory, heart, and orthopedic handicaps and were least aware of visual, physique, and diabetic disabilities. Physicians were best informed about heart, orthopedic, and central nervous system defects and poorest informed about physique, speech, and "Other" handicaps.

# BARKER, SCHOGGEN, SCHOGGEN, and BARKER

An analysis of the school status of children with particular disabilities indicates that the 12 school-age children who were not in school had the following handicaps: 7 central nervous system, 2 auditory, 2 physique, and 1 speech. The 7 children in special schools had the following disabilities: 2 visual, 3 auditory, and 2 central nervous system. All of the children with following disabilities attended school of some kind: visual, orthopedic, heart, diabetic, and other.

TABLE 5  
ADEQUACY OF SOURCES OF INFORMATION REGARDING  
PARTICULAR DISABILITIES

Disability	Total Cases	Per Cent of Total Cases Mentioned by		
		Laymen	Teachers	Physicians
Speech .....	61	52	85	8
Visual .....	42	31	83	17
Orthopedic .....	26	58	62	22
Central Nervous System .....	26	54	58	22
Heart .....	24	58	71	29
Auditory .....	23	61	70	17
Physique .....	18	39	78	0
Diabetes .....	5	40	60	20
Other .....	30	60	20	6

## SUMMARY

In this investigation a census was made of the physically disabled children of Jefferson County, Kansas, using teachers, laymen, and physicians as informants. The following definition of physical disability was used: A physically disabled person is one who is *generally perceived* in his cultural group to have a physique that prevents him from participating in important activities on a basis of equality with normal individuals of his own age. It was found that a total of 5.9 per cent of the children were seen by the informants to be physically handicapped according to this definition. The kinds of disabilities in order of their frequency of occurrence were: speech defects, visual impairments, orthopedic disabilities, central nervous system disorders, heart disabilities, auditory defects, abnormalities of physique, diabetes, and other scattered disabilities. Boys were more often seen to be disabled than girls, and school-age children were more often perceived as disabled than preschool or postschool children. Six and one-half per cent of the disabled children who were of school age were not in school and approximately four per cent attended special schools. No special educational provisions were made for the disabled children attending regular schools.

The best informants were the teachers; they provided information upon 76.5 per cent of the total number of disabled children discovered. Laymen

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reported 48.2 per cent of the cases found and physicians 17.7 per cent. Teachers were most aware of disorders of speech, vision, and physique. Lay informants were most sensitive to visual, physique, and diabetic handicaps. Physicians were most aware of orthopedic, central nervous system, and heart disabilities.

The survey showed the usefulness of general perception as a criterion of physical disability. It demonstrated that a survey using this criterion and using teachers and club women as informants can discover many physically disabled children relatively quickly and cheaply.

The applicability to other communities of the survey methods of this investigation depends upon the availability of adult informants who are in contact with children. In the present case, approximately 7 per cent of the entire adult population were queried. This amounts to about 15 per cent of the women of the county.

It would appear to be important to determine the relationship between the results of this kind of a census of physically disabled children and a survey involving medical examinations. It seems certain, however, that the method used in this investigation is adequate for many important social problems.

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SOME PROBLEMS OF FILMING CHILDREN'S  
BEHAVIOR: A DISCUSSION BASED ON  
EXPERIENCE IN THE PRODUCTION OF  
*STUDIES OF NORMAL PERSONALITY  
DEVELOPMENT*<sup>1</sup>

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The successful filming of children's behavior—as seen in such films as *A Child Went Forth* (3), in recent British Information Service films (e.g., 4), in Canadian films by the Crawleys (e.g., 8), in the Bateson and Mead films (e.g., 5, 6, 7), and, we believe, in the Vassar Series, *Studies of Normal Personality Development* (10)—requires significant departures from usual film-making procedures. Producers who are willing to make such departures succeed in producing films conveying authentic records of children's behavior; those who do not, produce films in which children's behavior appears stiff, unnatural, and posed.

Customary film-making methods, even for non-theatrical films, call for a complete conceptualization of the film in advance, with a script which outlines the action scene by scene and the commentary (or occasionally "live" sound) sentence by sentence. The camera crew is then sent to a location and has to arrange to provide one or more successful "takes" of each predetermined scene. Where there is skillful acting and directing and an ample budget, rare films of the high quality of *The Quiet One* (9) or *Angry Boy* (2) may result. Another example of this sort of filming is about half of the footage of our *Meeting Emotional Needs in Childhood: The Groundwork of Democracy* (10f). These films we may call *Dramatic Documentaries*. It must be kept in mind that such films—"documentary" and "authentic" though they may be—are not records of real events but represent the dramatized conceptualizations of the film-makers.

For many purposes such a procedure is not satisfactory in the study of children's behavior. One major device for achieving not merely authenticity but *actuality* is the complete recording of an experimental or clinical procedure. Such films are, for example, *Activity Group Therapy* (1) or *Finger*

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<sup>1</sup> Delivered at the annual meeting of the Society for Research in Child Development, Philadelphia, Pa., December 28, 1951, in connection with the showing of a new film in the Vassar Series (10h).

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*Painting* (10b), *Balloons* (10a) or *Frustration Play Techniques* (10c,d) of the Vassar Series, or the film we are now editing of the Hayes' home-raised chimpanzee, Viki. In each of these an entire significant situation is filmed—this is done the more easily, because it is physically limited in terms of space, materials, and number of children present; the action is short and concentrated and within ready view of the camera (and sometimes of the microphone). In other words, by having all the significant action taking place at a predetermined time and location, the task of the camera becomes simply to *record completely* what goes on. Later there may be some selection in the final presentation. In such filming the camera is usually, but not always, concealed. We may call these films *Record Documentaries*.

However, in films like our *A Long Time to Grow* (10h) or Losey and Ferno's *A Child Went Forth* (3) or Gregory Bateson's films on Balinese or New Guinea behavior (5, 6, 7), the cameraman must film selectively, since he is trying to record significant samples of the entire situation (e.g., life in the nursery school) in such a way that he conveys the special values and emotional nuances of this life; he is not in a position, as in the Record films, to film everything that goes on before his camera. The slogan for such filming might well be "wait and seize," and the resulting films may be labelled *Observer Documentaries* to emphasize the role of selective observation. It is fundamental to this approach that the cameraman does not go in and "make things happen" according to a script, as he must in the Dramatic Documentary, but rather waits for the event. It is equally fundamental that he cannot film everything, as in the Record Documentary, but must be sensitive to what is significant and seize upon it when it occurs. In general such procedure at present is limited to filming only, since the addition of live sound considerably reduces the possibilities for flexible operation. (This is true because of a variety of technical obstacles, including difficulties in the coordination of cameraman and sound man; the intrusion of additional cumbersome sound equipment; the necessity for heavy blimping of the camera to silence motor noises; and, most important, the inability of the sound equipment to select a particular portion of the field to concentrate upon as the camera can do—sound recording is most adversely affected by the rattle and noise of toys, the poor acoustics of most play rooms, the presence of surrounding noises.)

In making Observer Documentary films on this Wait and Seize basis, we have arrived at certain governing principles which may be of value to those attempting a similar approach:

1. *We never tell the children what to do; with only the rarest of exceptions we do not tell the teachers what to do.* It should be remarked that this approach is often very frustrating to the cameraman who has been trained traditionally, to light and arrange his scene in advance and to cause the appropriate action to start when he is ready to film. Rather, this newer



procedure requires general lighting of a region of the room and filming when appropriate or desired events naturally take place. In such filming we must accept the risk of a child walking in front of the camera at the wrong moment or suddenly turning to stare. This is not to speak of the usual hazard of the camera being unwound or out of film at the crucial moment. However, if children's behavior is to be spontaneous and real, intrusions upon it must be avoided.

We mentioned occasional exceptions to the rule. It may be of interest to those familiar with our film *Preschool Incidents No. 1, When Should Grown-Ups Help* (101) that two of the scenes there were "induced" by instruction to the teacher. Because we could not find in all the thousands of feet of film in our library of unedited material any episodes where a teacher imposed unwanted help or failed to give help that a child needed, we arranged to film scenes where a teacher would insist upon giving more help to the child than the child wanted or the teacher would ordinarily give. The child was *not* coached (but *was* unanimously voted by the staff "most likely to resist") and the resulting scene is an eloquent portrayal of a child indignantly rejecting help that she felt quite able to dispense with. However, such "induced" scenes are very rare in our filming.

2. *The cameraman is there, as much as possible a part of the scenery, and is prepared to film almost anything that happens.* In achieving acceptance as part of the nursery school scene, we have found it important to allot ample time for the entire process of becoming-a-familiar and for the filming itself. This means that such filming cannot be done by the usual film producer's method of moving in with the overwhelming paraphernalia of lights and equipment for one or two days, filming, and moving out again; the cameraman must, instead, become part of the staff and part of the scene for an extended period, either on consecutive days or for a day or two each week over a period of weeks. In filming *A Long Time to Grow* (104) the cameraman was with the group filmed for one or two days a week throughout the school year. In the process of putting up the lights (semi-permanent installation) he aroused great interest and took care to answer all the questions the children raised. For a while the children called him "Mr. Light." Afterwards the camera was brought in to habituate the children by many "dry runs" without film, at which point the photographer was addressed as "Mr. Camera" by many of the children. The lights were left on all the time the cameraman was there, and not switched on and off. The children became so used to the brilliant illumination they were even able to sleep under it. Wires and supports were placed high on walls and ceiling and did not interfere with the children's play space. The children were permitted to peer in the camera and through the view finder whenever they wished, but a definite rule against touching was established. In these ways, "Mr. Camera" became so much a part of the scene that the intrinsically more fascinating children's world of the nursery

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school again became dominant for the children over the stimulus of cameraman or camera equipment.

3. *We here found it definitely unsuitable to film to a planned script.* Rather, the professional staff discusses thoroughly with the cameraman the general purpose and plan so that *he is able to decide as he watches the children's on-going activity what to select for filming.* (See also 5, below.) This process necessitates a cameraman who is not merely skillful and knowledgeable in terms of camera, lighting, shooting angles, etc., but one who knows children well and one who understands the point of view and filming plans of the professional staff thoroughly. Ideally, perhaps, the professional student of behavior acquires the necessary photographic skill, as, e.g., Gregory Bateson has done. For some of the Vassar films (e.g., *Meeting Emotional Needs in Childhood: The Groundwork of Democracy* (10f) and much of *This Is Robert* (10e)) the writer acted as cameraman, taking on the role of "photopsychologist" or "psycho-photographer." In shooting *A Long Time to Grow* (10h) we had the services of Mr. Josef Bohmer, who is not only a cameraman but one who specializes in filming children's behavior and who has himself taught young children. Without sensitive perception of children and clear understanding of our point of view, he could not have assembled the footage in *A Long Time to Grow*, with its warm rendering of the human values and relationships of nursery school (for example, the scene of the teacher reading to a child on her lap, helping another child nearby, and returning to quiet, affectionate support of her sleepy audience; or the scene in which the earnestly-mothering two-year-old keeps returning to her self-imposed task of elaborately putting her doll to bed). Such "shooting" is best done where there is an on-going program of film-making and not just a single film to be made. Many interesting activities may thus be filmed when they occur and put to use much later. For example, the scene in *Meeting Emotional Needs in Childhood* (10f) where two children struggle over an ill-advised attempt by one of them to shove a doll carriage through a small tunnel, was filmed some five years before that film was assembled and released.

4. *In the actual filming, certain specifications have been found essential:*  
(a) *The scenes must be long enough* so that the development and outcome of action may be clearly noted. Very brief sequences either fail to give the audience a chance to grasp what is going on or fail to convey the actual tempo of behavior. This matter of tempo will be referred to again later.  
(b) *The camera should be kept low* most of the time to approximate a rendering of the child's-eye view of his world.  
(c) While long shots are necessary from time to time to give the setting, filming of children's behavior demands *many close-ups* to render the "language of behavior"—the mirroring in face and hands and actions of the *meaning to the child* of the situations in which we see him behave.

5. *The processes of filming and editing go on concurrently.* Starting with a general theme, the photographer begins to collect the desired footage; with the professional group or director, he goes over the footage and a more detailed script is prepared in successive stages, incorporating particularly useful scenes and making the organization more and more explicit. Only towards the end of this process is a "final script" realized and special effort may then be made to obtain a few needed scenes, either by concentrating the "Wait and Seize" process on likely aspects of the children's activities, or by searching through footage on hand in our library of unedited film. As we have indicated before, this process of letting the script wait on the filming runs counter to usual procedures but is essential to provide flexibility and to allow children's behavior to speak eloquently for itself (as in the sequence in *A Long Time to Grow* where a girl is finger-painting for the first time and appears to be savoring each nuance of the new experience with her every pore and fiber; such a sequence could not have been planned in advance). As editing proceeds and the work-print is cut, it is particularly important to keep in mind that those working with the film every day come to know the film so well that special pains must be taken not to cut the scenes too short. It is here, again, that we run the risk of presenting behavior that is too fragmentary or of falsifying the true tempo of behavior, so important, for example, in distinguishing two- and three-year-olds from older children.

6. *The edited film is then audience-tested.* It used to be necessary after the work-print of the picture was edited to write the sound track, record and synchronize it, and call it a day. The advent of tape equipment has enabled us to introduce a new step in film-making which has proven to be extremely valuable, a step which will never be omitted in any future Vassar film, and which was very important in the making of our last few films—*When Should Grown-Ups Help?* (10i), . . . *And Then Ice Cream* (10j), *When Should Grown-Ups Stop Fights?* (10k), and *A Long Time to Grow* (10h). This step consists of audience try-outs, using the work-print of the film and roughly synchronized tape-recorded narration. *A Long Time to Grow*, for instance, was produced in this way. After most of our film was in hand, the work-print was cut and the commentary prepared for recording; under the old method, this would have been our final version of both picture and sound. However, five further revisions were made of details of sound and picture to correct flaws revealed by successive try-outs with different audiences. With the help of audiences of Vassar students, students at New Paltz State Teachers College, students at Teachers College (Columbia University), the staff of the Yale Child Study Center, and a large audience of the Westchester Council for Nursery Education, successive revisions were made involving both changes in wording and re-cutting of the scenes. Through the try-out process we were able to clarify points which audiences found obscure, to correct inappropriate implications and

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emphases, and even to note where we had to pause to prevent a line from being smothered by laughter; in short we were better able to assure that we were successfully *conveying* what we had in mind to others. This now appears to us an indispensable part of the final editing process.

In general, then, by introducing skill and sensitivity in the understanding of children to *all* stages of the film-making process; by establishing an atmosphere of mutual trust among children, nursery school staff, professional personnel, and camera crew; and by pre-testing the effectiveness of communication, it seems possible to make motion pictures a more effective tool for teaching and for studying children's behavior.

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2. *Angry Boy* (Alexander Hammid and Irving Jacoby for Mental Health Film Board). Distributor: International Film Bureau. 30 min., black-and-white, sound.
3. *A Child Went Forth* (Joseph Losey and John Ferno). Distributor: Brandon Films, Inc., 20 min., black-and-white, sound.
4. *Children Learning by Experience*. Distributor: British Information Services. 40 min., black-and-white, sound.
5. *Dance and Trance in Bali* (Gregory Bateson and Margaret Mead). Distributor: New York Univ. Film Library. 20 min., black-and-white, sound.
6. *First Days in the Life of a New Guinea Baby* (Gregory Bateson and Margaret Mead). Distributor: New York Univ. Film Library. 20 min., black-and-white, sound.
7. *Karba's First Years* (Gregory Bateson and Margaret Mead). Distributor: New York Univ. Film Library. 20 min., black-and-white, sound.
8. *Know Your Baby* (Crawley Films for National Film Board of Canada). Distributor: McGraw-Hill. 10 min., color, sound.
9. *The Quiet One* (Campus Films with Wiltwyck School). Distributor: Athena Films. 67 min., black-and-white, sound.
10. Vassar Series: *Studies of Normal Personality Development* (Mary S. Langmuir, L. J. Stone, J. Bucher, and J. Bohmer), Distributor: New York Univ. Film Library.
  - a. *Balloons: Demonstration of a Projective Technique for the Study of Aggression and Destruction in Young Children*. 15 min., black-and-white, sound.

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- b. *Finger Painting: Children's Use of Plastic Materials.* 20 min., color, silent (sound speed).
- c. *Frustration Play Techniques: Part I. Blocking Games.* 15 min., black-and-white, sound.
- d. *Frustration Play Techniques: Part II. Frustration and Hostility Games.* 15 min., black-and-white, sound.
- e. *This Is Robert: A Study of Personality Growth in a Preschool Child.* 80 min., black-and-white, sound.
- f. *Meeting Emotional Needs in Childhood: The Groundwork of Democracy.* 30 min., black-and-white, sound.
- g. *Pay Attention: Problems of Hard-of-Hearing Children.* 30 min., black-and-white, sound.
- h. *A Long Time to Grow. Part I. Two-and-Three-Year-Olds in Nursery School.* 35 min., black-and-white, sound.
- i. *Preschool Incidents. No. 1. When Should Grown-Ups Help?* 13 min., black-and-white, sound.
- j. *Preschool Incidents. No. 2 . . . And Then Ice Cream.* 10 min., black-and-white, sound.
- k. *Preschool Incidents. No. 3. When Should Grown-Ups Stop Fights?* 15 min., black-and-white, sound.

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